Telephony

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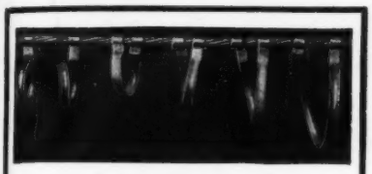

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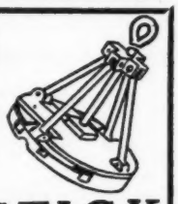

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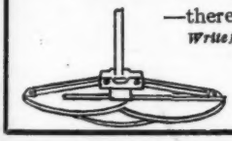

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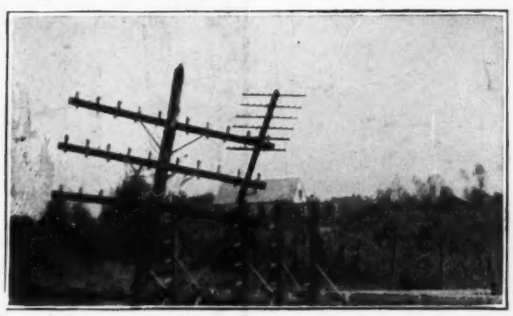

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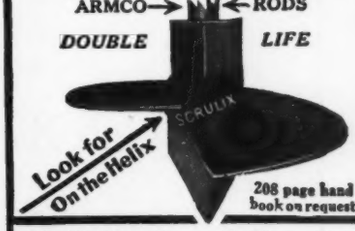

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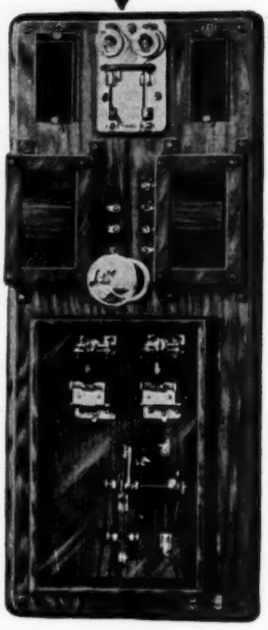

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

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Subscription—10 Cents a Copy
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"Our associated companies are not under any obligation or coercion to buy of the Western Electric Co.," says the 1917 report of the Bell organization.

Some Bell licensees are beginning to buy in the open, Independent market. Is it because the Bell factory is too busy on other work? Time will tell.

Local Ownership Safest.

A writer in the "Investor's Guide," a financial department in the Chicago Tribune, recently made a powerful argument in favor of local ownership of corporation stock that has a direct bearing on the Independent telephone business.

The advantage of locally-owned public utilities over utilities whose owners and managers are out of touch with the communities, which such enterprises serve, has been especially evident in the telephone industry. Both the Independents, who enjoyed that advantage, and the Bell interests, who suffered the handicap of long-range supervision, have appreciated this alike.

Under the caption "Investments Near Home Safe ," the Tribune says:

If an investor puts his money in an enterprise located in his home county, city and ward, it is safer, other things being equal, than an investment far away. The fact that he can see the property often and know by direct observation whether it is improving or deteriorating is an advantage, as he thus gets early warning in case of danger. The greatest advantage, however, is in the investor's ability to help protect his holding from aggression.

Corporate property has been a mark for years for attack by both demagogues and professional reformers. No matter how justly and honorably the business of a corporation may be conducted, agitators are always ready to denounce it. Sometimes there may be a sound basis for these attacks, but, whether there is or not, it is the innocent investors, not the promoters and officials, who suffer.

If the investors are near at hand they can put forth their best efforts to defend their property and their votes will command the respect of aldermen and legislators. The influence of one individual investor may be small, but by investing near at home he puts himself in a position to use that influence with the greatest effect possible, and insofar increases the safety of his investment. However large or small may be the influence which any one person can wield, it is greatest in his home ward and decreases steadily as the distance from that spot increases.

No thoughtful observer needs to be reminded of the great advantage of local ownership in the telephone business. The single fact that "home folks" owned the stock in the local Independent company has often been sufficient to enable that company to make a successful fight against the unfair competition of a rich and powerful corporation, whose management was located in Dey street, New York.

The reason outlined in the foregoing quotation is sound, but it is equally true that the failure of foreign owners to cultivate pleasant relations with the community served by their corporation, is largely responsible for bitter feeling often displayed by the public. There is no doubt that home investors are a valuable asset to any utility company. That fact is now generally recognized.

Texas on the Job.

TELEPHONY is glad to note that the Texas Independent Telephone Association, at its annual convention at Dallas, last month, adopted strong resolutions commending the work of the United States Independent Telephone Association. The Texas association is composed of wide-awake, aggressive, and progressive telephone men, and they are on the right track in urging their members to join the national organization and participate in its benefits.

If the Texas motto for the year, "500 members in 1917," is realized—as we hope it will be—there should also be a healthy growth of national association members in the Lone Star state. They might not all be able to attend the Chicago convention, but they would be sure to derive a great deal of benefit from enrollment on the membership list.

Speaking of Texas resolutions, we also are pleased to acknowledge the vote of thanks extended to TELEPHONY for its support. We can only reply "Much obliged, don't mention it," and add that we wish all the state associations of Independent telephone men were as enterprising and up-to-date as the Texas organization.

Indianapolis Is Now Automatic

Indiana City Cut Over to Automatic System on March 17—Eight Offices in Indianapolis Exchange Which Has Many New Automatic Features—Description of the System and Some of the Innovations Introduced

By John Grant

The automatic telephone system, cut into operation the night of March 17 at Indianapolis, Ind., marks as a mile post the present commercial state of the art of telephone equipment. It is the latest in automatic telephone achievement yet put into operation.

A most remarkable fact in connection with the installation is the time taken to manufacture — lock, stock and barrel — and install this large system. It was on June 16, 1916, just nine months before the cut-over, that a definite decision was made to displace the manual equipment throughout and install the automatic. When the unprecedented state of the raw material market is taken into account, the task undertaken and accomplished in this record time may be in a measure appreciated.

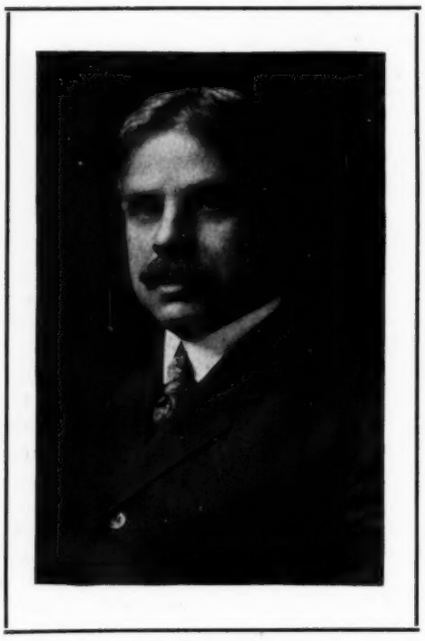
At the time the directors of the Indianapolis Telephone Co. decided to install the automatic, with a view to keeping pace with the more and more exacting demands of business and society for rapid telephone service — and that demand in the face of the almost impossible girl-operator situation confronting all large manual plants — their instructions were to provide consistently. Whims of engineers were to be second to the service demands of the subscriber as discerned by the company's management; efficiency in operation from the subscriber's standpoint was to be paramount. This is the telephone system Indianapolis now enjoys.

The system is made up of eight office districts, namely, Main, East, North, South, West, Park, Clifton and Irvington, covering the entire city and suburbs. The manual system had these same office districts, though a new building was erected for Clifton office and new quarters provided for Irvington office.

The Main office is on the same premises as previously, but in a modern four-story fireproof building, built less than three years ago, but not before occupied in the space used for the automatic equipment. The switchboard occupies the entire third floor and has ample light. There is room left on the same floor for an ultimate capacity sufficient to render service to approximately 20,000 subscribers in the district served by that office. The rack room and arrangement on the second floor also have taken into account the same prospective growth.

Other than mentioned, the automatic equipment has been placed in the same buildings that previously held the manual equipments; these having been deemed suitable. The first four-named offices are "main branch" offices while Park and Clifton are sub-offices of North. Irvington is a sub-office of East, and West is a sub-office of Main.

The system being the so-called "100,000 system," as manufactured by the Automatic Electric Co., of Chicago, provides for one digit — the first of the five necessary—to determine the main-branch office in which the called party's telephone line obtains service with the general system. Thus, in the case of a subscriber in a sub-office, it determines the main-branch office of which the sub-office obtains its service with the system. However, in the case of Park office, which is temporarily operated as a sub-office of North main-branch office, a separate level or first digit is used signifying that sub-office.



President Wm. Fortune.

The North main-branch office and Park sub-office levels, 4 and 7 respectively, are tied together throughout the system. Obviously, different thousands are used in the North main-branch office and the Park sub-office to avoid confusion. For instance, North main-branch contains numbers 41,000 to 45,000, while Park sub-office contains numbers 77,000.

At such time as it becomes advisable to make Park sub-office a main-branch office, it will only be necessary to provide direct trunks to and from that office and separate the temporarily multipled levels throughout the offices of the system. Subscriber's numbers will not be changed.

West office is now likewise operated as a sub-office in the main "2" office, but will later — in about 90 days — be operated as a sub-office of Main "3"; the latter "office" to be in the same building and merged with the Main "2" office. It will not be necessary to change the subscribers' numbers in West sub-office at the time of change, since the "2" and the "3" levels are tied together throughout the system.

West sub-office is the "39,000 group" and has the first selectors for outgoing calls located in Main office, while the third selectors for incoming calls are located in West office. Thus calls between West office subscribers route by way of trunks to first and second selectors in Main office and third selectors in its own office.

Park sub-office containing the "77,000 group" has the first selectors for outgoing calls located in North office, while the third selectors for incoming calls are located in Park office. Thus calls between Park office subscribers route over trunks by way of first and second selectors in North office and third selectors in its own office.

Clifton sub-office containing the "49,000 group" has the first selectors for outgoing calls located in North office, while the third selectors for incoming calls are located in Clifton office. Thus calls between Clifton office subscribers route over trunks by way of first and second selectors in North office and third selectors in its own office.

Irvington sub-office containing the "67,000 group" has the first selectors for outgoing calls located in East office, while the third selectors for incoming calls are located in Irvington office. Thus calls between Irvington office subscribers route over trunks by way of first and second selectors in East office and third selectors in its own office.

However, in the latter case to afford economy in trunks to and from East office, the relationship of the equipment is such that calls between Irvington subscribers are routed through a switching repeater which permits the release of the normally-selected trunk extending to East office and thus affords a direct connection within its own office. The connection thus passes through a switching repeater,

third selector, and thence to the connector which has access to the called party's line.

The pulling of the second digit, if it be "7," determines the subsequent functions attained. For calls destined outside of its own office, the normal route will be taken, the switching repeater effectively performing no special function beyond that of a normal repeater.

There are direct trunks between the main-branch offices, looping through the Main office. These trunks are "two-wire" with repeaters introduced at the calling end to supply talking battery to the calling subscriber and to control the release.

The repeaters are designed to reverse battery toward the calling subscriber if "reverse" battery is projected back over the trunk from the connector having access to the called subscriber's line. This provision is for use in the event of metered or prepay service; a further object being to allow for differentiation between commercial subscribers and "company" numbers, and to afford supervision when calling from private branch exchange switchboards and the like.

Calling a "company" number will not effect a reversal back towards the calling subscriber so that service meters would not be operated on such calls.

The outgoing trunks of sub-offices to the main branch offices have repeaters at the sub-office introduced between the line switch and the outgoing trunk. Outgoing trunks from main branch offices to their sub-offices have repeaters introduced between the second selector in the main branch office and the third selector located in the sub-office. The object of this provision is, as before mentioned, in connection with main-branch office trunks.

At the present time there are 10,400 line switches installed in all offices combined in units of 100, and connector bank numbers to the aggregate of 16,500 made up as follows:

Main office, 5,400 line switches; 8,100 connector bank numbers.
North office, 2,500 line switches; 3,800 connector bank numbers.
South office, 900 line switches; 1,400 connector bank numbers.
East office, 600 line switches; 1,100 connector bank numbers.
West office, 200 line switches; 500 connector bank numbers.
Clifton office, 200 line switches; 500 connector bank numbers.
Park office, 300 line switches; 600 connector bank numbers.
Irvington office, 300 line switches; 500 connector bank numbers.

Of the 8,100 connector bank numbers in Main office, 800 are reserved for P. B. X. operation. The connectors accessible to them are of the rotary and group-selecting type.

In the North office, 100 of the 3,800 connector bank numbers are for P. B. X. operation as just outlined. In each one of the other main branch offices, and the sub-offices thereof, there are 100 connector bank numbers accessible to rotary or group-selector type connectors as a part of the total.

East, South, West, Clifton, Park and Irvington offices, being out of the business district, there is not enough demand for P. B. X. trunks at the present time to fill a complete connector bank unit of 100. Hence in order not to have idle connector bank equipment, the trunks to the connectors of the P. B. X. groups multiple with an otherwise vacant "100." For instance, in East office the 61,300 is a "P. B. X. 100." The 61,600 does not exist in fact, but due to a multipled connection of the 61,300 and 61,600 connector terminals, numbers are assigned as in the 61,600 unit and are connected to subscribers from the 61,300 unit, using levels in the latter unit that will not be used for P. B. X. service.

At such time as the assignment of the P. B. X. trunks shall encroach upon the numbers in the levels alloted to general subscriber service, the bank and connector unit 61,600 will be installed apart from the P. B. X. unit. This expedient was employed in order to avoid idle investment and it is in every way practicable from an operating standpoint.

In the Main office the connector bank units are in groups of 12, with the exception of three P. B. X. units that are in groups of 24, the latter being two groups of 12 connected in multiple.

There is an average of approximately nine connectors to each connector bank group. One test connector is provided for each connector bank group. Therefore, there is room for two additional connectors if traffic should demand it. Space has been left between the bays holding the 100 line-switch units so that three additional connector banks may be added to each connector bank group if necessary. There is no permanent connection between the line switches and the connector banks.

The line switches are in groups of five bays of 100 contained in sheet steel cases with hinged glass doors. On the back of each unit of line switches there is room for 24 connector banks, or two units of 12. In the main-branch offices the first, third and fifth line-switch units only have connector banks mounted on their backs, allowing the back of the intervening units, vacant at present, to be used for the mounting of any additional connector banks that may be required.

As has been mentioned, this space has not been allowed for in sub-offices where the likelihood of shortage is very remote. It was deemed more practicable to allow this space immediately adjacent to the connector banks that would be connected with them, than to cable to some other portion of the office when such an exigency should arise. Under these conditions a switchman will always find the connector banks of the same units contiguous.

It has been stated that three units of 100 P. B. X. connector banks are made up of 24 connector banks each — being two groups of 12 — while the remaining six units are in groups of 12. For commercial reasons, in making allotments liberal allowance was made for growth in the number of trunks to P. B. X. subscribers to preclude so far as possible being obliged to change a subscriber's number upon obtaining a contract for additional trunks. By the use of two groups of 12 banks as a unit, it is possible to double the number of trunks to any one subscriber by cutting the multiple and connecting the various contacts in each bank group of 12 to a trunk, since each bank group of 12 is independently cabled to the intermediate distributing frame.

In assigning numbers to the P. B. X. subscribers, all possible care was taken to assign small subscriber-trunk groups and those subscriber groups that would probably not become much larger ultimately, to the units of 12 banks, reserving the units of 24 banks for the heavier users and those liable to require more trunks. However, provision was made so that if at any time a 12-bank group will not be sufficient to handle the traffic, a second group of 12 banks can be added, thus making them 24 group connector bank units.

Of the approximately nine connector switches used in each general subscriber connector bank unit group, a portion of the switches are combination local and toll. In Main office this approximates three per unit group; in the other offices, two per unit group; and in the P. B. X. it approximates four per unit group.

These combination switches are installed primarily for toll service. Under these conditions the talking battery supply is cut off from them and is supplied from the third toll selector when the selector obtains access to them.

When the local switches "overflow," the combination connectors are used as local connectors, with standard local circuit relations in them. This affords special connectors for toll service, affording special high efficiency transmission conditions, still allowing emergency connectors for the local traffic.

Handling Subscribers' Changes.

Every effort was put forth to forestall to the limits of commercial and engineering practicability the changing of subscriber's numbers — regardless of change of class of service or of moving to other location in the same office district — whether party or individual. It may be stated that there is a considerable party-line development in the exchange, there being two-party business, two-party and four-party residence. Bridging harmonic subscribers' signals are used.

It was recognized that changing a subscriber's number when changing a classification is not only expensive to the company as to the records in the bookkeeping and directory departments, but that it entails an expense at the information desk. Aside from this, it means that dead equipment must be held until after the issuing of a subsequent directory. Even then confusion often arises, due to stationery which may be out bearing the previous number, or by a subscriber referring to an old directory. These things are primarily service functions.

Calling a number hurriedly and finding one's self replied to by an information operator over a traffic trunk, inquiring "What number are you calling?" has in the past almost ruined naturally serene dispositions, temporarily at least. The average subscriber will not properly appreciate the service afforded if exasperating delays and interceptions are encountered. So with a proper appreciation of these prime elements of service together with the purely commercial aspects, it was decided to allow each subscriber a permanent number, which he might keep so long as he remained anywhere in the same office district.

When the company's representative now solicits a subscriber, looking to changing his class of service to a higher-paying one, the representative does not have to overcome the heretofore objection — that of the prospective change of number incident to the class change. Aside from this, party lines may be regrouped to placate "incompatible" combinations. Moreover, for purely engineering and operating reasons it is often advantageous to regroup and concentrate party line subscribers on any line. This can be done readily without any service inconvenience whatsoever to the subscribers concerned. Again a large economy is effected by being able to keep party lines 100 per cent. "loaded," as a new subscriber with a new telephone number may be immediately substituted for a subscriber who has before been associated with the line, but who has been disassociated by reason of discontinuing his telephone or by being transferred to another line.

Party Line Ringing.

A novel practice has been introduced relative to party line subscribers, in that each such subscriber is notified through a special postal card form as to who are "co-parties" with him; the ringing code number for each and instructions as to calling the parties are also given.

Special frequency selectors are installed in each office which project proper current to actuate the called and calling subscribers' bells alternately. For instance, if a subscriber whose signal frequency is 16 cycles calls the subscriber on same line whose signal frequency is 33 cycles, the calling party will pull 181 and replace his receiver on the hook when both his bell and the called party's bell will alternately ring. Upon cessation of the ring, due to the called party's response, the calling party will remove his receiver for conversation. If no response is obtained, simply removing and replacing his receiver by the calling party will restore the line to normal.

Each calling combination as relates to signaling frequency, has a separate code — 182 calls to or from 50-16; 183 calls to or from 16-66; 184 calls to or from 33-50; 185 calls to or from 33-66, and 186 calls to or from 50-66.

In order to take fullest commercial advantage of this courtesy of notification, attention is drawn to the fact that four-party subscribers may be changed to two-party subscribers, or any party subscriber may be changed to individual service without changing the telephone number incident thereto. It is planned to promptly mail new cards upon grouping condition changing.

As an economic measure it is expected the plan will prove cheaper than visiting subscribers and placing information on cards carried by telephones in a perhaps scrawled hand. This is aside from the "annoyance to subscribers" element involved.

Line switches are not permanently associated with connector bank numbers. Therefore, if an individual line subscriber should discontinue service, the only equipment vacancy that would be entailed would be the connector bank number, so the line switch may be immediately reemployed.

A novel arrangement has also been introduced in the scheme of assigning numbers to subscribers in that each unit of 100 connector bank numbers comprises an approximately proportionate number of subscribers of each class that the particular office contains. That is to say, there will be an approximately equal proportion of individual and party line subscribers of each class in each 100 unit.

This applies to the distribution throughout the primary line switches, with the exception of P. B. X. trunks outgoing and incoming in Main office, and outgoing only in other offices. The Main office exception is due to rendering temporary manual answering service as will be described later. From this it will be recognized that abnormal peaks will not be probable in any connector bank or line-switch unit.

The feature of enabling the subscriber to retain his original number regardless of his moving within the same office district, or on his change of classification, has not heretofore been employed, the Indianapolis plant being the first of this type. The operation of this feature will, therefore, be watched with considerable interest.

Due to the traffic divergence existing between the various classes, theoretically at least, it may be expected there will be a tendency to an equal traffic over each line-switch unit and to every connector bank unit throughout the respective offices, conducing to the same economies attained in employing large trunk groups. Thus, since the traffic is uniformly distributed, the minimum number of connector switches and first selector and line switches will be required in each unit, for it must be borne in mind that the maximum instantaneous traffic is what determines the total number of connectors and first selectors necessary in any group. The total traffic over a stated period is secondary to this.

Uniform Traffic Distribution.

To further spread the traffic uniformly, the P. B. X. connector units, which may be looked upon as heavy traffic units, are distributed uniformly throughout the various thousand groups. This, however, applies only to Main office, as the other offices have but one unit, while, as stated, Main office has eight units. The P. B. X. unit is the 300 group in each 1,000 whereever it appears, not only in Main, but in all offices. Thus if the middle digit of the number is "3," it may be assumed that the number is that of a P. B. X. trunk.

It may be stated here that in the Main and the North offices, secondary line switches are employed to concentrate the traffic to the first selectors. These secondary line switches are reached over trunks from the primary line-switch units. They consist of one secondary group of five units in the North office and three secondary groups of five units each in the Main office. The trunks from the primary line switches to the groups of secondary line switches are distributed uniformly with a view to making the traffic as uniform as possible through the groups of secondary line switches and from the secondary line switches to the first selectors accessible thereto.

It will thus be seen that every effort has been made to make the traffic uniform throughout the exchange, not only to line switches and connectors but to intervening first, second and third selectors. This means that the minimum amount of equipment has been employed to handle any traffic offered.

It is possible that additions or subtractions will have to be made to selector and connector groups, after the traffic assumes a normal condition. It, however, was deemed advisable to make an extra provision by reserve connectors and selectors to cope with any possible abnormal traffic that may be thrown upon the system immediately after the cut-over, due to novelty.

A novel feature has been introduced into this plant not heretofore employed in full automatic practice, in that a manual operator is available to those subscribers who by reason of preference or infirmity

(Continued on page 34.)

The Iowa Independent Convention

Twenty-Second Annual Meeting of The Iowa Independent Telephone Association Reveals Awakening to Needs for Co-operation and Getting Together — Good Addresses and Discussions Features of Convention

By Stanley R. Edwards

Co-operation, spelled "co-hoperation," meaning "get together, stick together and hop to it," was the prevailing spirit of the annual convention of the Iowa Independent Telephone Association. The meetings were held at the Chamberlain Hotel, Des Moines, March 13, 14 and 15. On account of a sleet and wet snow storm, the attendance at the first day's session was rather small, but by the end of the second day the registered attendance was approximately 230.

The New Officers.

The election of officers resulted in the selection of J. H. Denkhoff, of Dyersville, as president; R. C. Saunders, of Manila as vice-president, and Chas. C. Deering, of Des Moines, as secretary-treasurer.

Those selected for service on the executive committee are: President Denkhoff; Vice-President Saunders; H. S. Kinney, of Woodbine; J. M. Plaister, of Fort Dodge, and C. A. Farrington, of Centerville.

The first session on Tuesday afternoon was opened by J. M. Plaister, of Fort Dodge. Mr. Plaister presided at all sessions in the absence of President H. B. Shoemaker, who recently disposed of his telephone interests and has withdrawn from the telephone field.

Secretary Deering was called upon and presented his report as secretary-treasurer. The activity of the association relating to the matter of interference with high tension lines was outlined. Mr. Deering stated that the association has contributed to a fund for the conducting of experiments by Professor A. H. Ford, of the State University of Iowa. Approximately $1,000 has been spent by the association. The experiments have been started, but are not completed.

After the case on inductive interference before the railroad commission was heard, Mr. Deering stated a case of a mutual company had come before the district court. This suit was brought for the loss of three months' service. The stipulation of facts was that if the telephone company was entitled to recover, it should recover $3 per month per station.

The court, in rendering judgment in this case, awarded the telephone company damages to the extent of one month's service and the cost of making the telephone lines metallic. It was held that one month's time was sufficient to make the change from grounded line to metallic.

The case has been appealed to the state supreme court. Being of large interest to its members, the association will lend the assistance of its attorney in the prosecution of the case.

Secretary Deering told of the work of Miss T. Anne Barnes as traveling chief operator. She was employed by the association for the entire year with the exception of two months, during which time she was engaged in the work of the operating schools conducted by the Iowa State College. The school work was very successful and another series is now being carried on.

This year less objectionable legislation has been proposed than in recent years. Mr. Deering directed attention to bills in which the members are interested and outlined the status of each.

J. M. Plaister.

Announcement of the committee appointments was made by Mr. Plaister as follows:

Resolutions: M. A. Reed, Woodbine; Wm. Byrnes, Vail; J. S. Beers, Armstrong; C. K. Gray, Ainsworth, and W. N. Dow, of College Springs.

Nominating committee: H. L. Beyer, Grinnell; T. A. Davenport, Belmont; and J. B. Woodside, New London.

Mr. Plaister explained the provisions of the by-laws, which provided for the election of vice-presidents at meetings of the various districts. Owing, however, to the fact that the Iowa association has never held district meetings, the vice-presidents have never been elected. Hence, in order to provide a vice-president and thus obviate a condition such as had arisen in the absence of the president, Mr. Plaister appointed G. E. Atkinson, of Creston, as chairman of a committee to draft a change in the by-laws.

E. B. Fisher, of Grand Rapids, chairman of the board of directors of the United States Independent Telephone Association, spoke on the subject, "Independent Telephony," after which the session adjourned.

Wednesday Morning Session.

The first speaker at the Wednesday morning session was W. S. Vivian, of Chicago, secretary-treasurer of the United States Independent Telephone Association, who spoke on the subject, "Organization."

"The telephone has broadened public opinion more than any other thing," said Mr. Vivian, in his opening words. Getting down to his subject, the speaker stated that it is true that large companies have no particular need for affiliation with the association. They have their own organization and are able to get results without the association and the aid of other companies. He showed, however, that they have a need for the organization of the smaller companies.

The class C companies, Mr. Vivian said, have a fair organization and get along fairly well without association. Class D companies, about 10,000 in number, need organization and they need it greatly. An illustration of this need was then presented.

Considering the subject of organization, Mr. Vivian read part of the paper on organization presented by L. E. Hurtz, general manager of the Lincoln Telephone & Telegraph Co., at the convention of the United States Independent Telephone Association in December, 1915. The success of the Lincoln company, Mr. Vivian stated, is due to efficient organization.

Discussing the remuneration of telephone men, the speaker stated they do not receive the salary that they are entitled to; that instead of being the best paid men in their community, they are the lowest paid. Organization, he stated, will have a great influence in bringing about better salaries.

Mr. Vivian expressed his opinion that organization should begin by the hold-

The Automatic Saves The Aut

Salaries of operators

Payrolls for operators are growing steadily. Wages are going up, hours of labor are being shortened, age limits for employment of girls are being raised, and operators are organizing in many localities.

The Automatic Telephone knocks out this swelling payroll because it needs no operators. The Automatic is made—not paid—to give perfect service.

Human hands and heads—liable to make mistakes in spite of training and skill—no longer appear on the payroll when you install the Automatic system.

The little dial on the base of each phone serves as private operator for every Automatic user. So easy is it to get connections that little children have no trouble calling by dial. Added to this simplicity, the Automatic is convenient, swift and accurate.

And it will save your company the cost of operators' salaries.

Cost of hiring new operators

Have you noticed that it is more difficult to find suitable girls for operators than ever before?

Even in country villages there are fewer girls desirous of learning switchboard work, while in towns of any size the problem is really serious. City exchanges spend thousands of dollars advertising for girls, and thousands more in training them, paying them salaries during training, and otherwise looking after their comfort and health.

All this up-to-date and expensive treatment of "hello girls" is necessary in order to keep the switchboards supplied with the necessary human link. For it is a well known fact that telephone girls marry faster than any other class of girls—over 50 per cent leave within the first year.

Cupid is not the only enemy of the exchange manager. You must provide for extra operators against vacation time, emergencies, rush periods, and epidemics such as grippe.

Because the Automatic Telephone has no operators all these problems and expenses disappear in one sweep.

Investment in idle equipment

When you install an ordinary switchboard you are obliged to provide for future expansion at the outset, thus tying up a considerable amount of money in equipment which will not be used—will not produce any revenue—until your business has reached a certain growth.

With the Automatic, you take as much central office equipment as experience shows you will need within a short period of time. You do not try to cover now what you may need ten years later. The capital you invest in Automatic equipment begins to earn a dividend immediately, and does not lie idle. For when it becomes necessary to increase your central office equipment you find that the Automatic unit system expands as easily as a sectional bookcase, without interfering with the old service.

Expensive buildings and furnishings

You telephone men who are confronted with the necessity of building finer exchanges, or of remodeling old ones in order to make them more congenial for the operators, must be interested to know that Automatic companies effect a great saving on cost of buildings.

There are no operators on the Automatic switchboard—therefore no need for recreation rooms, lounging and dining halls, expensive plumbing, and, in some cases, reception parlors.

The Automatic central office equipment needs a dry, clean place. That is all.

24-hour service

With the Automatic you can giv your subscribers exactly as good ser vice at midnight or at 4 a. m. as yo do at noonday. And you do not spen a cent for night operators' salaries.

Telephone exchanges in all part of the country are being pressed fo better night service. Rural subscrib ers especially are demanding contin uous service, for people who once ge into the habit of telephoning want t

Uniform service

When floods or blizzards break u transportation, telephone service i needed most by your subscribers— but that is when it can be least de pended upon. For operators de tained at home, unable to reach thei exchanges, cannot make connection on the switchboard.

Then there are other emergencies which may find the operators all a their posts, but still unable to giv anything like satisfactory service un der the avalanche of calls which occu in an election night rush, after a fir

Freedom

Managers declare that they dropped worry overboard when they installed the Automatic equipment.

Complaints are an exception rather than a rule on Automatic service.

One exchange with 1600 subscrib ers recently went fourteen days with out a single complaint due to service. Another exchange with 2800 subscrib ers went fifteen days without a com plaint.

Automatic equipment outlives man ual. One company writes that after

Cheap and

Your present operating man will be able to handle Automatic adjust ments. Our operating department is always glad to train old employes for the new apparatus.

We never turn over an Automatic central office equipment without a set of standard written instructions to be followed in making inspections and adjustments. These give most gratifying results.

In the first exchange spoken of

Rural exchanges are bowing under increased cost of local batteries. Automatic Telephone rural lines work perfectly on common battery transmission, thus saving from $1.50 to $2.00 per year on each phone, for fresh batteries and for the labor of changing batteries.

Automatic Elec

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

matic Gives The Automatic Wins

t no extra cost

el free to telephone at any time, ay or night.

Hiring more operators to give 24-our service is costly, and means a ss to the company, as this improved rvice seldom brings in increased evenue.

The Automatic gives 24-hour ser-ice, 365 days of the year, without xtra cost to you!

uring emergencies

r marine calamity, or in times of ar. On such occasions, when it eems that every line is calling at nce, the operators—human beings, ith human limitations—are first ver-rushed, then confused, then wamped, and finally demoralized.

The Automatic Telephone does not epend upon human heads, hands and erves. Its dial and switchboard andle calls as fast as the electric mpulses are sent over the wires to he central office equipment. Auto-natic service remains uniform hroughout any emergency.

rom worry

en and a half years' successful ser-ice their central office equipment as not begun to show signs of wear. British government engineers report hat Automatic equipment will erve 33 years or longer, successfully. urthermore, all new improvements o Automatic service are standard-zed, so that all existing Automatic lants can adopt them immediately.

These are a few of the reasons why utomatic service relieves managers f worry.

asy maintenance

bove—fourteen days without a rouble complaint—one man and one oy looked after the daily adjust-ments. In the larger exchange which went fifteen days without a complaint, one man and one girl at-ended to adjustments. No "high-alaried experts" are necessary in Automatic exchanges.

Cost of maintaining an Automatic xchange has been found uniformly ow.

Right to fair rates

Although every item of cost in giving telephone service has increased greatly, companies frequently find it difficult to obtain rates sufficient to offset their increased expenses.

Rate commissions have held in many cases that higher rates cannot be charged unless they are shown that the service is distinctly improved, and higher cost of production is not accepted as a basis for a higher, fairer, return.

But in case after case, the Automatic Telephone has been held so much superior that higher rates have been authorized after its installation.

What is the attitude of Automatic subscribers, you ask? There is seldom any complaining, for the reason that the improvement in service out-distances the increase in rates so much that subscribers are glad of the change.

New subscribers

Two obstacles prevent the growth of most ordinary telephone exchanges:

1. The cost of getting new subscribers to sign contracts.
2. Necessity of hiring more operators to handle more lines.

Both these impediments are removed by the Automatic.

No matter how many new Automatic subscribers are secured, no new operators need be hired. Every board is equipped to take care of an ultimate number of lines considerably in excess of the lines immediately cut into service. As new subscribers ask for service it is only necessary to add their lines to the central office equipment. The dial and switchboard furnish the service.

As the installed capacity of the Automatic equipment is reached it is not at all difficult to add another unit to the switchboard, which works in perfect harmony with the older sections.

Once the Automatic Telephone has had a chance to demonstrate its superiority to the people of a town, it is easy to get new subscribers. Old users recommend it with enthusiasm.

Good will

To have satisfied subscribers everywhere praising your service is vastly better than to have even a handful of dissatisfied subscribers complaining at your service.

Wherever installed, the Automatic Telephone is a great good-will builder for the company. People soon discover for themselves that the phone without the girl is quicker, surer, easier, and more pleasant to use—and that it gives uniform and perfect service twenty-four hours every day.

Satisfied customers mean more customers. Good will is quickly converted into cash.

National recognition

This is a most auspicious time for you to announce that your exchange will cut over to Automatic, for the people of America are reading every month—in the greatest advertising mediums—all about the superior service rendered by the Automatic Telephone.

For you to announce that your exchange will adopt the Automatic Telephone, will stamp you at once in your community as progressive and deserving of full confidence. You will, indirectly, but none the less certainly, "cash in" on this national publicity now being given the Automatic Telephone.

Over 1,000,000 Automatic Telephones are now in use. They serve large and small exchanges equally well. Let us tell you what other exchanges similar to yours are doing. We have had 25 years experience which we will gladly place at your command.

tric Co., Chicago

ing of district meetings. Meetings in the various districts, he stated, should be held at least quarterly.

It is the tendency of people, he said, to believe evil rather than good. Hence, people should get together oftener, get acquainted and develop the power of co-operation.

The purpose of the Bell company, the speaker stated, is the same now as it was 25 years ago, except that it is going at it in a different way, as its policies are different. So long as there is an Independent organization, the Bell company will be restrained from going ahead.

In speaking of the value of the United States Independent Telephone Association, Mr. Vivian stated that it is a restraining influence, that it watches national legislative matters and that the legislative committees listen to the association representatives where they would not listen to individuals. This was cited as evidence of the influence of the association, which represents an investment of $250,000,000.

Interstate Commerce Commission accounting matters and decisions were discussed and the association's influence illustrated. The questions and information which the association can furnish members was dwelt upon and instances cited of the value of this service.

A plea for courtesy, the spirit of which should be drilled into every employe, was made by Mr. Vivian. "Plan for every possibility so that the subscribers will be satisfied and the people will advertise the company," said Mr. Vivian. "The public will have to be educated and cost of service will be studied. Organization will help solve all the problems."

Ames' Part-Time School.

J. Will Parry, of Ames, director of the engineering extension department of the Iowa State College, was the next speaker. His topic was "Ames' Part-Time School for Telephone Employes." In opening his address, Mr. Parry told of the origin of the idea of operators' schools in Iowa. Sixteen schools were held last spring and 14 are planned for this year. The expenses of these schools are paid by the state and they will be continued as long as needed.

Last year courses in telephony in the regular four-year work at the state college were instituted. They aim to ground the student in engineering work. The extension courses in telephone work were organized to give the public benefit.

The plant men's schools, which were started last year, were discontinued on account of lock of uniformity in the questions which could be taken up. The questions did not seem to be correlated very well in order to bring about efficient work.

This coming fall it is planned to start a part-time school in telephone work. Briefly, the idea is that the student will go to school for a period and then work for a telephone company for a corresponding period. School and work will then alternate in varying periods. It is the intention now that students will work for telephone companies from May 1 to October 1 and attend school at Ames from October 1 to May 1.

This will be a two-year course, taking up business English, mathematics, applied mechanics and electricity. All men who enroll in the course will be passed upon by the telephone company, which takes them into its employ. Both Bell and Independent telephone companies in Iowa are afforded the advantages of the school.

Round Table Discussion.

Following Mr. Parry's address, a round table discussion was participated in and a lively interest shown by all in attendance. W. A. Eckels, of Norra Springs, spoke relative to financial troubles, that is, the sale of securities. He advocated the association's considering a plan for aiding companies to obtain funds for building and maintenance. In his opinion, such a plan would prevent many small companies from selling out to the Bell.

Mr. Eckels' remarks brought up the question of rates, which, it was stated, are too low and also the fact that there are too many leaks.

W. A. Potter, of Oakland, stated that dividends are not certain in the small companies due to low rates. One leak is in the making of collections, it being almost impossible in his opinion to keep in touch with removals. He believed that a plan could be worked out whereby if a man leaves without paying, the manager of the plant into the territory of which he moves should aid in making the collection before furnishing him service.

George S. Sowers, of Spring Hill, Kan., spoke briefly on collections and advocated sending out statements.

Another manager, in discussing collections, stated that in November he makes it his business to learn who is to move in March. With this information on hand, he immediately begins getting up collections on those delinquents.

W. H. Daubendick, of West Bend, in speaking of organization, stated that large companies through years of experience have evolved a system to take care of collections. These systems should be adopted and made uniform. There is a way of doing things by organizing and getting together. "Get together" was his advice.

"Telephone service has been too cheap for years," said Mr. Daubendick, "and everyone knows you and will not loan to you for that reason."

"Show that your business is run in a legitimate and safe manner and money will be forthcoming," said J. A. Nixon, of Dayton. "Use a deposit plan and no difficulty will be experienced in collections." Mr. Nixon expressed his opinion that the country exchanges ought to make their service good and pay employes well. "Show that you have business ability," said Mr. Nixon, in closing, "and you will get money."

J. S. Barnes, of Marcus, brought up the question of franchises which are very near the expiration of their life. In such cases, he stated, it is impossible to get the public to invest in a company's securities in order to obtain funds for extensions.

The last speaker of the morning was Chas. C. Deering, who discussed the public utilities bill known as H. F. 406. This places the entire regulation of telephone companies under the railroad commission. Mr. Deering stated that the bill would come up before the Iowa house for consideration on March 22.

Iowa Public Utilities Bill.

"This bill," he said, "declares telephone companies common carriers and makes the railroad laws, so far as applicable, apply to telephone companies. It gives the railroad commission full and broad powers over telephone companies, including such matters as rates, service and extension of plant. It gives the commission power to require physical connection of every sort and kind except 'between competing exchanges in the same city or town for subscribers residing in such city or town.' The bill forbids the valuation of franchises. It does not take from cities or towns any powers that they now have.

Indeterminate Franchise.

"It gives telephone companies the indeterminate franchise or the right to continue to operate so long as they obey the laws and the orders of the commission. This is the same right or privilege that the railroad companies have, that the ordinary business man or corporation has."

"The telephone has come to stay," Mr. Deering stated. "We can imagine nothing to supplant it. The public is primarily interested in rates and service and the indeterminate permit is a factor. A telephone company, whose franchise life is nearing an end, in the very nature of things will not spend any money for improvements and extensions if it can possibly avoid doing so. This is ordinary business prudence on account of the uncertainty of the terms of a new franchise, and, further, such a company usually finds it impossible to finance such undertakings as it feels that it must carry on, for the investor will hardly put up money against the uncertainties of a franchise renewal.

Under such circumstances the public

is the sufferer and yet the reasonable business man will hardly blame the telephone company. Building a telephone plant under a 20-year franchise is just like putting up an expensive building on a lot leased for 20 years. No one knows what the landlord will ask after the lease expires.

The Iowa Supreme Court in both the Des Moines and Charitan cases held that telephone companies operating prior to October 1, 1897 (the date the present code went into effect), have perpetual franchises. Thus the rights of the Bell company in almost all of the towns in which it operates exchanges and the rights of the older Independent companies are determined.

We argue that the indeterminate franchise is fair, just and logically right, and that it makes for continued better service to the public. Our small Independent companies are just as much in need of, and entitled to, continuing rights as the larger companies.

Competition Limited.

"This bill provides a method of procedure for a company desiring to build a competing plant. This is designed to limit such competition to places or occasions of real public convenience and necessity. The provision is that a company desiring to build a competing plant shall have a public hearing before the commission resulting in a finding that the public convenience and necessity require such a competing plant, after which the granting of a franchise shall be voted on by electors in the manner now provided by law.

This is a protection to the telephone companies and to the public, and it provides a means for the starting of a competing plant whenever necessary. Many telephone plants have been built in the past by promoters who secured franchises by vote of the people through promises of rates and service, which every well posted telephone man knew could not be maintained, but which the public did not know. In some cases such promoters have sold out without investing a dollar, having no other object in view than to secure a franchise and sell it to the man first on the grounds.

In other places such competitive plants have been built and, due to the fact that with a brand new plant the maintenance charges were very low and the effects of depreciation not noticeable, the early days of the operation of the plant showed an apparently large profit, and the promoter was able to sell out to an unsuspecting public. A good many farmers' mutual companies have been built in this state in competitive situations. These plants have almost always been built as a protest against unsatisfactory service or rates. Under the operations of this bill, both of these matters would be determined by an impartial board.

A few years ago there were two exchanges in every moderate and good sized town in the state. Due to public demand, a majority of these towns has seen competition eliminated and no town that has had two exchanges and eliminated one of them desires to repeat its experience. The two things that the public is largely interested in are service and rates, and with these two things fairly adjusted, the public wants but one telephone exchange in a town."

Wednesday Afternoon.

"Rural Telephones in Europe" was the subject of an exceedingly interesting address by Frank G. Odell, of Omaha, Neb., secretary of the Federal Land Bank. Mr. Odell has appeared before a number of state conventions and presented some very interesting information relative to telephone operation under government ownership.

Chas. C. Deering.

In his address before the Iowa convention, he compared the rural telephone development of England with that of Iowa and the development of the province of Aisne, in France, with that of Custer county, Nebraska.

In bringing out the value of the telephone to the farmer, Mr. Odell cited the case of a Nebraska farmer who had a herd of hogs afflicted with cholera. A telephone call was made with the experiment station of the University of Nebraska at Lincoln, at 11 o'clock in the morning, and an inquiry made relative to obtaining serum. As a result of the telephone's use, the serum was sent on the 12:15 train from Lincoln. It was received by the farmer at 5:15 the same afternoon and the herd was saved by 7 p. m.

Delays in the installation of rural telephones in England were cited. It was stated that five years have elapsed since applications were made for service and telephones have not been installed, according to the report of the chairman of the telephone committee of the British parliament.

Bureaucracy and inefficiency are creeping into every form of government. To illustrate the red tape of government procedure in this country, the course of a pay warrant was traced. As proof that the same red tape exists in other countries, the course of an application for a new telephone line in Australia was outlined and shown to be subjected to no less than 32 handlings. In closing, Mr. Odell stated that government should be reduced to efficiency.

Inductive Interference.

The next speaker on the program was A. H. Ford, of Iowa City, professor of electrical engineering in the State University of Iowa. Professor Ford presented concrete facts relating to the subject of inductive interference, which he stated is quite complicated from an engineering viewpoint. The fundamentals were set forth and remedial measures given.

Special consideration was given to the grounded telephone line. It was stated that the subject of inductive interference with telephone lines is of increasing importance to Iowa telephone men, as some 750 miles of high-tension lines were built in the past year. Professor Ford's paper will be published in full in a future issue of TELEPHONY.

A discussion followed and a number of questions relating to difficulties experienced with high tension lines were answered by Professor Ford.

K. C. Barth, of the Barrett Co., Chicago, delivered a very interesting address on the subject of "Wood Preservation." Mr. Barth stated that it is an economic waste to lose poles if such loss can be prevented. The supply of poles, according to experts, is definitely limited. Hence, there should be co-operation to conserve the supply. If each pole consumer will increase the life of the poles he uses five to 15 years, depending upon the method of treatment employed, the cause of conserving our natural resources has been considerably advanced.

Mr. Barth presented a table which gave the costs of poles in detail, with and without the use of preservatives. In a specific case there was a 25 per cent. decrease in the annual charge which resulted from brush treatment of five-in., 25-ft. cedar poles.

The brush treatment, the speaker stated, is not as efficient as the open tank treatment, but it shows five years' increase in the average life. When the preservative treatment must be given in the field, brush treatment is advisable.

When consumption is less than 2,000 poles annually and 18 years of life is expected from the poles, the brush treatment is advisable. If a greater life is desired, the tank treatment is recommended.

Brush treatment, the speaker stated, lasts as long as the film of preservative is permanent or unbroken. Hence, efficiency is dependent upon the penetration obtained.

Two grades of standard creosote oil are in use — refined and crude.

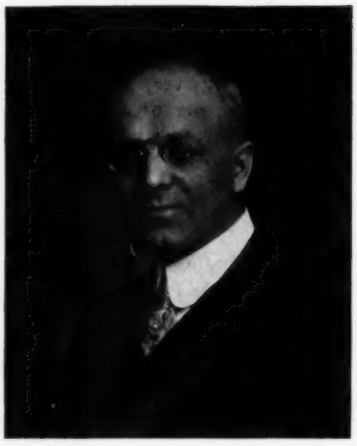
Before treating, the poles should air dry and the inner bark removed. Otherwise the treatment is valueless.

As the use of preservative extends the life of poles, Mr. Barth stated that the preservative treatment of cross arms is also advisable.

The first speaker at the Thursday morning session was L. F. Evans, of Clarinda, who spoke on the subject of "Collections." Mr. Evans related several personal experiences and told of instances where $1 and $2 rates were in force and accounts of $60 and $90 were found on the books.

The most general reason given by a manager for a large amount of arrears in rental is that "the man is good when his 'ship comes in.'" It is a personal acquaintance equation. The manager must understand that collecting is not a personal acquaintance question. Then there is the man who is willing to pay but has not the money. He should be cut off, as he cannot afford a telephone.

There is no one method which can be used in making collections. Human nature and its understanding is a great factor in successful collecting.



Harold L. Beyer.

"Imagine yourself the one owing," said Mr. Evans. "What method would be successful if used against yourself. When you figure this out, put it into practice."

Entire dependence should not be put upon regular monthly statements, as they will not get all of the accounts. If unable to see a man personally, endeavor to write to him the same as if he were present and being talked to.

"The mere sending of a form letter," declared Mr. Evans, "has no more effect than the monthly statement. Write him and forestall his arguments. Show a patron disputing his account that you are willing to meet him half way."

The speaker cited an experience where he found that the accounts were six months in arrears, due to the absence of the bookkeeper. A collection tour resulted in most of the bills being paid. On one account a woman refused to pay for the tolls, stating that she had never made any of the calls listed. Mr. Evans finally made calls to a number of the parties whose names appeared on the list and obtained from each an idea of the purpose of the call. He then submitted this information to the woman and she expressed her willingness to pay for those, but still insisted that the other calls that had not been looked up were not hers.

In order to obtain collection of the entire amount, Mr. Evans traced each call and demonstrated to her that the accounts were correct. After that he had no further difficulty with that subscriber and bills were always paid without protest.

Emphasis was placed by the speaker upon the importance of carrying out threats made to take out telephones for non-payment of rentals. To illustrate how this worked out, experiences with the inauguration of a discount payment method was related. After service had been discontinued to several subscribers, no further difficulty was experienced.

In closing, Mr. Evans advocated the establishment of a credit bureau for listing delinquent subscribers. Attention was directed to the fact that all other trades have credit bureaus and the speaker voiced the sentiment that telephone companies should also have one.

Probably the most interesting address of the convention was that delivered by J. H. Shoemaker, of Cedar Falls, who spoke on the subject, "Servant and Master." The point which Mr. Shoemaker drove home was that the increasing cost of living is not due to the common carriers, such as railroads and telephone companies, but to other elements of the cost of production, 60 per cent. of which goes to the grower.

The greatest amount which could possibly be obtained from the common carriers is an extremely small item when comparison is made with the amount which the common producer appropriates as his share of the cost of production.

In considering the subject of public and master, the speaker stated that the public is the master of the telephone companies and its operators, but on the other hand the telephone man is a part of the public in regard to the railroads and proposed strikes. "If a telephone man is not interested in having the railroad public, of which he is a part, sympathetic, who is?" asked the speaker.

In discussing the rise in prices, Mr. Shoemaker presented a table which showed that in the period 1896-1915 wages increased 45 per cent.; the wholesale prices of all products increased 50 per cent., while the retail prices increased 82 per cent; farm products increased 92 per cent. and land 250 per cent.

These percentages would be considerably higher if they were brought down to date, owing to the enormous increases which have taken place in the last year.

A table of events was presented as follows:

1. Bureau of agriculture established.
2. The National Grange organized, 1866.
3. First grange legislation adopted, 1871.
4. First favorable decision, 1877.
5. Interstate Commerce Commission organized, 1887.
6. North Dakota legislature controlled by the farmers, 1916.
7. Food riot for the first time, 1917.
8. What's next?
9. Who's caring?

The speaker stated that $50,000,000 are spent annually in this country to help the producer who obtains 60 per cent. of the sale price of produce.

"The farmers could save $10,000,000 a day if they would use what the government has spent $50,000,000 annually to provide," asserted Mr. Shoemaker. "The increasing cost of living is due not to the common carriers but to other elements of the cost of production, 60 per cent. of which goes to the grower."

In conclusion, Mr. Shoemaker stated: "The public wrongly appropriates its funds. The appropriation for assisting agriculture, assists in raising the cost of living. The telephone man can aid in educating the public to correct this condition."

At the conclusion of Mr. Shoemaker's address which was listened to very attentively, J. M. Plaister, of Fort Dodge, pointed out the lack of understanding and cited an instance of a person's opinion being changed by having the facts placed before him. The morning session then adjourned.

The closing session, Thursday afternoon, was called to order by Chas. C. Deering, who asked for the reports of the committees. The report of the resolution committee was presented by M. A. Reed, of Woodbine.

The telephone utilities bill, H. F. 406.

was endorsed as fair to the public and the telephone companies and the legislature was urged to pass it.

Another resolution expressed contempt of the methods which were being used to oppose the bill by means of the circulation of anonymous letters and telegrams, a practice which was stated to be un-American.

Thanks were tendered to all the speakers and others concerned in making the convention a success.

Harold L. Beyer, of Grinnell, presented a comprehensive paper on the subject, "High Tension Line Interference and the Decision of the Railroad Commission."

Mr. Beyer reviewed the decision of the Iowa Railroad Commission in regard to induction interference and rules for construction of high tension lines which was filed December 30, 1916. He presented the facts upon which the commission based its decision and analyzed the decision on the law applicable to the situation. As the subject is one in which telephone men are greatly interested, the paper will be published in full in a future issue of TELEPHONY.

George E. Atkinson, of Creston, then presented the report of the committee on amendments to the by-laws. Article 3, which relates to the officers, was amended to provide for the election of a vice-president, and other articles of the by-laws were changed to correspond with this amendment. The report was unanimously adopted.

The report of the nominating committee was presented by Harold L. Beyer. The officers and executive committee, as recommended in this report, were unanimously elected. Their names have been previously given.

President-elect Denkhoff, of Dyersville, was then called upon and spoke briefly, expressing his appreciation of the honor conferred upon him and voicing his determination to do all in his power to further the interests of the association.

W. H. Fowler, of Pella, spoke relative to the manufacturing situation. He was optimistic about the telephone business but declared that greater efficiency was needed. He pleaded for support of the manufacturers and emphasized the need for getting closer together. Illustrative of this need, he told how suspicion had been centered upon one of the large manufacturing companies as opposing and using underhand methods to prevent the passage of the telephone utilities bill, H. F. 406.

Declaring this suspicion entirely unwarranted, Mr. Fowler stated that an arrest had been made and that the party responsible for the anonymous letters and telegrams which had been condemned by resolution, was in custody. Upon his name being mentioned, the manufacturing company under suspicion was entirely cleared.

Mr. Fowler's remarks relative to getting closer together with the manufacturers were supplemented by short talks by W. S. Vivian, of Chicago, and E. B. Fisher, of Grand Rapids, Mich.

Railroad Commissioners Chassell and Lewis were then introduced to the convention and expressed their pleasure at having heard the address by Mr. Shoemaker at the morning session.

A round table discussion brought up the subject of local boards of supervisors granting franchises and it was urged that this jurisdiction be taken away from them.

Harold L. Beyer spoke of the value of publicity and stated that the newspapers should be utilized to a larger extent. The presentation, in them, of service talks, statements, etc., tend to make better relations with the public, he declared.

R. L. Parker, of Traer, brought up the subject of toll commissions on terminating and reversed calls. This resulted in considerable discussion in which C. A. Long, of Monroe; A. A. Wells, of Marathon; W. H. Daubendick, of West Bend, and others, participated.

The discussion culminated in a motion by R. L. Parker, seconded by A. A. Wells, that a committee of three be appointed to investigate toll commissions and report its findings to the executive committee. The motion was adopted.

After a motion to adjourn was seconded, Secretary Deering declared the 22nd annual convention of the Iowa Independent Telephone Association closed.

Seven of those in attendance at the convention were injured more or less seriously and a number sustained minor bruises Wednesday noon, when bleacher seats on which they were to have their pictures taken, collapsed in front of the hotel.

The falling of the seats was caused by the breaking of one of the main supports which had a defective place in it.

The injured were:

H. C. Larrabee, Belle Plaine, manager of the Belle Plaine Telephone Co., bones in foot mashed.

J. E. T. Johnson, Gowrie, manager of the Lena-Gowrie Telephone Co., back wrenched.

F. G. Berry, Gladbrook, with the Mutual Telephone Co., foot and hip injured.

Aaron Floyd, Casey, manager of the Casey Mutual Telephone Co., head cut.

W. H. Fowler, Pella, manager of Fowler Telephone Co., foot sprained.

A. J. Cole, Omaha, with the McGraw Co., ankle sprained.

Frank McGinnis, Sioux City, with the McGraw Co., arm sprained.

Why Every Company Should Become a Member of Our Association.

By W. H. Trimm

It seems to me that in the telephone business the day has passed when a man or a company can safely sit tight in his own town, or his own territory, and not give any consideration to the affairs of the industry as a whole. Perhaps following such a course was all right a few years ago, and certainly it seems easier to keep out of things which do not affect you immediately. But today there are questions being considered, and decisions being made, which sooner or later are sure to be reflected in the affairs of every telephone exchange.

The officers of the United States Independent Telephone Association are devoting a great deal of time and energy watching developments and guiding action wherever possible, to the end of protecting and improving the conditions under which telephone companies operate. These officers should have the advice, assistance and support of every representative association made up of practically every Independent telephone man in the industry.

W. H. Trimm.

The cost of membership is so small and the results, both direct and indirect, are so great that no one should even hesitate in sending an application for membership and a check for $5 to Secretary W. S. Vivian, 19 South La Salle street, Chicago.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

631. Enumerate the principal advantages of the internal combustion motor.

632. Why does the gas engine sometimes give out more or less power after a change in fuel than before?

633. Outline the process of changing the heat energy of the fuel into mechanical energy by combustion in the engine cylinder.

634. What is the advantage in the so-called two-cycle engine?

635. How is gasoline adapted for fuel for use in the internal combustion motor?

CHAPTER XXIV. Power Plant Prime Movers (Continued).

636. *Oil fuel internal combustion motors.*—In section 633, the rise in temperature of the explosive mixture in the engine cylinder of the gas or gasoline engine was given as one of the results of compression of the charge on the compression stroke of the piston. It is true that the compression of *any* gas causes latent heat to be released and it is also true that the expansion of *any* gas causes heat to be absorbed by the gas.

A commonplace illustration of this principle is found in the heating of the barrel of a bicycle or automobile tire pump when it is in use inflating a tire. The compression of the air in the barrel of the air pump causes heat to be set free from the air and imparted to the metal of the pump cylinder.

Now should the clearance space in the gas engine cylinder, into which the charge is compressed, be reduced in its cubic capacity, the increase in temperature due to the resulting greater compression of the charge is very likely to be sufficiently above the ignition temperature of the compressed mixture to cause premature firing. An illustration of this fact is found in the knocking experienced when running an automobile engine at slow speed and full load with open throttle when there is any considerable deposit of accumulated carbon in the clearance space of the cylinder.

The efficiency of any engine depends, however, upon the difference between the *initial* temperature and the *exhaust* temperature of the active medium in the cylinder. In other words, more energy is applied to the engine piston when the number of heat units absorbed in the cylinder is large than when it is small.

That this must be true is at once evident when it is remembered that the mechanical energy delivered to the rotating shaft of the engine is derived from the heat energy in the fuel. It is also true that practically 50 per cent. of the heat units delivered to any internal combustion motor is wasted in the unavoidable loss due to cooling the cylinder walls to insure proper lubrication.

Any method by which the initial temperature in the cylinder at the beginning of the power stroke may be raised will, other things being equal, increase the efficiency of the motor. More energy will be delivered directly to the surface of the piston.

637. *The Diesel oil engine.*—Owing to the comparatively *low firing temperature* of other fuels, heavy and cheap oils have been used for fuel in the high compression type of motor. At the present prices for internal combustion motor fuels, these engines unquestionably furnish the means of generating power at lower cost than almost any other known method. To offset this advantage, this type of motor is somewhat heavier per horsepower, slightly more difficult to start, and the fuel is somewhat dirtier and more troublesome to handle.

The present successful type of motor using heavy and cheap fuel is known as the "Diesel" or "Semi-Diesel" engine. It is named after the man who first eliminated the practical working difficulties that stood in the way of commercial success. The cycle of operations in the "Diesel" motors is somewhat different from that employed in the ordinary "Otto" cycle engine.

Large engines of the Diesel type are in successful operation, but the engine of this general type of a size suitable for use in telephone offices is more often built to operate according to the semi-Diesel cycle, while the Diesel cycle is used in the large capacity oil engines for general power purposes.

638. *Diesel cycle.*—In the Diesel cycle the suction or intake stroke of the piston fills the cylinder with *pure* air free from any admixture of the fuel. At the end of the succeeding compression stroke, this volume of *pure* air has been compressed to a very small fraction of its volume at atmospheric pressure.

Owing to this compression, which runs as high as 500 pounds per square inch, the temperature of the air in the combustion chamber of the engine cylinder has been raised to a point far above the ignition point of the fuel. While it is at this high temperature, the fuel valve is opened and the fuel in a finely-divided form is sprayed, under high air pressure, directly into the very hot compressed air in the clearance space or combustion chamber. Owing to the high temperature of the compressed air into which it is sprayed, the fuel at once ignites and combustion takes place with a further rise in the temperature of the cylinder contents.

This combustion of the fuel in the compressed air delivers power to drive the piston forward just as the explosion in the gasoline engine cylinder drives the piston forward in the power stroke. When the fuel valve has been closed, the burning gases continue their expansion, delivering power until the exhaust valve is opened at or near the end of the power stroke. The exhaust stroke and the scavenging of the cylinder then take place exactly as they do in engines operating according to the Otto cycle.

Like the Otto cycle engines, these motors deliver power to the shaft during one forward stroke of the piston at every two complete revolutions of the crank for each cylinder.

639. *Semi-Diesel cycle.*—In the semi-Diesel cycle of operation, the successive conditions are about the same as those in the pure Diesel cycle. Instead, however, of injecting the fuel spray directly into the highly-compressed air in the cylinder, it is thrown in finely-divided form into the combustion chamber.

The combustion chamber, or explosion head, is a closed space communicating with the interior of the cylinder but free from any water jacket or other means for cooling. The walls of this explosion head are, therefore, very hot, due to the heat communicated to them from previous explosions.

As the compression stroke approaches completion, the compressed air is forced before the advancing piston into increasingly intimate contact with the finely-divided fuel in the combustion chamber.

At the same time the temperature of the air and fuel in the cylinder is steadily raised by the increasing degree of compression. When the stroke has progressed to a point at which the fuel and the air are thoroughly mixed and at high temperature, ignition occurs and the fuel and air mixture is exploded behind the piston, driving it forward in the power stroke.

The compression in the cylinder of the semi-Diesel type of internal combustion motor is not as high as that in the pure Diesel type, running from 100 to 250 pounds per square inch.

In the sizes of semi-Diesel motors suitable for use as prime movers in telephone offices, the initial heating of the combustion chamber may be done by an ordinary gasoline blow torch. After the first explosion of the fuel and air in the combustion chamber and cylinder, the walls of the combustion chamber will be heated sufficiently without the application of outside means.

Aside from the disagreeable nature of the fuel and the slight difficulty in starting, the semi-Diesel motors are very satisfactory and the cost of power produced by their use is very low. The type of engine described as being included in the semi-Diesel classification is sometimes called the Hornsby-Akroyd engine.

640. *Explosion and combustion motors.*—Some internal combustion motor authorities have attempted to force a classification of all motors of the oil fuel type into explosion motors and combustion motors. The idea underlying this division is that the high compression oil engines working on the Diesel cycle may be considered combustion engines owing to the undoubtedly slower combustion of the fuel in the cylinder. Engines operating on the Otto and semi-Diesel cycles are to be considered as explosion engines.

The explosion of the fuel and air in the one case is merely a quicker combustion, however, and the distinction seems to be somewhat artificial. Should it be used, it will serve the purpose to remember that the explosion types of motor are those using the lower compression in the cylinder at the end of the compression stroke, while those known as combustion motors are operated at extremely high compression values at the same point in their cycle of operations.

641. *Speed regulation.*—It is important that gas and oil engines, when used for producing power for telephone office power plants, should have rather close speed regulation. This is especially true when the engine is used to drive a generator charging storage batteries that are floating on the exchange load. Should the generator speed in such cases be irregular for any reason, the condition would be very likely to cause noticeable noise in the lines supplied with current from the charging battery.

There are two general classes into which all speed-regulatory devices for use with internal combustion motors may be divided. In one class the speed is controlled by varying the proportion of power to idle strokes, and in the other regulation is obtained by varying the amount of energy imparted to the piston on the power stroke, the *number* of power strokes being left unchanged.

The first method is commonly known as the "hit-or-miss" method. When the speed of rotation of the engine rises above the predetermined figure, the governor acts and prevents the admission of fuel for the next power stroke so that no energy is expended on the piston for the succeeding cycle. In this way the power stroke of the next cycle is eliminated and the speed of the engine drops to a point that will allow the governor to again admit fuel.

In the second method, known as the "throttling" method, the amount of fuel supplied to the engine cylinder for the power stroke is reduced at excessive speeds so that the resulting amount of energy expended upon the piston is also reduced and the power stroke is weakened.

When the speed of rotation has fallen to a value justifying an increase, more fuel is again supplied for the power stroke with a resulting increase in the strength of the power stroke and in engine speed. By this method no power strokes are omitted and each cycle of the operation is carried out normally.

Both types of regulation have their enthusiastic advocates and both are satisfactory in practice.

642. *Fly-wheels and internal combustion engines.*—The use of heavy fly wheels is essential in all internal combustion engines used in telephone power plant service. Unlike the steam engine, the power delivered by an internal combustion engine cylinder is not applied continuously to the engine shaft but is delivered during the power stroke only.

This intermittent delivery of power would prohibit the use of the internal combustion engine in many classes of service were it not possible to store the energy of the power stroke in heavy fly wheels for later release. In other words, the heavy fly wheels serve as a means of absorbing excess power on the power stroke of the piston, giving it back to the engine shaft during the time that the piston is absorbing power rather than delivering it to the shaft.

Single-cylinder gas and oil engines for use in the telephone office power plant for driving charging generators should always be provided with the extra heavy fly wheels used by the engine manufacturers for electric light service. Single-cylinder engines equipped with the special electric light fly wheels, will give satisfactory speed regulation with the "hit-or-miss" type of governor and the variation in generator speed will not, of themselves, produce objectionable noise on the telephone lines supplied from the charging battery.

Engines having more than one cylinder should give much better speed regulation, owing to the increase in the number of power strokes per average revolution of the shaft.

(To be continued.)

Confer on Plans to Give U. S. Rapid Wire Service.

Officials of the leading telephone and telegraph companies conferred in Washington on March 19 with war department officials and Director Gifford of the council of national defense, to perfect plans to insure the government rapid and efficient wire communications in event of war.

Theodore N. Vail, president of the American Telephone & Telegraph Co., headed the delegation, which included Newcomb Carlton, president of the Western Union; Charles P. Bruch, vice president of the Postal: F. B. MacKinnon, vice-president of the United States Independent Telephone Association, and N. C. Kingsbury, vice-president of the American Telephone & Telegraph Co.

The delegation also conferred with Brigadier General Kuhn, president of the army college; Brigadier General Squire, chief of the army signal service, and Commander Todd, director of the navy radio.

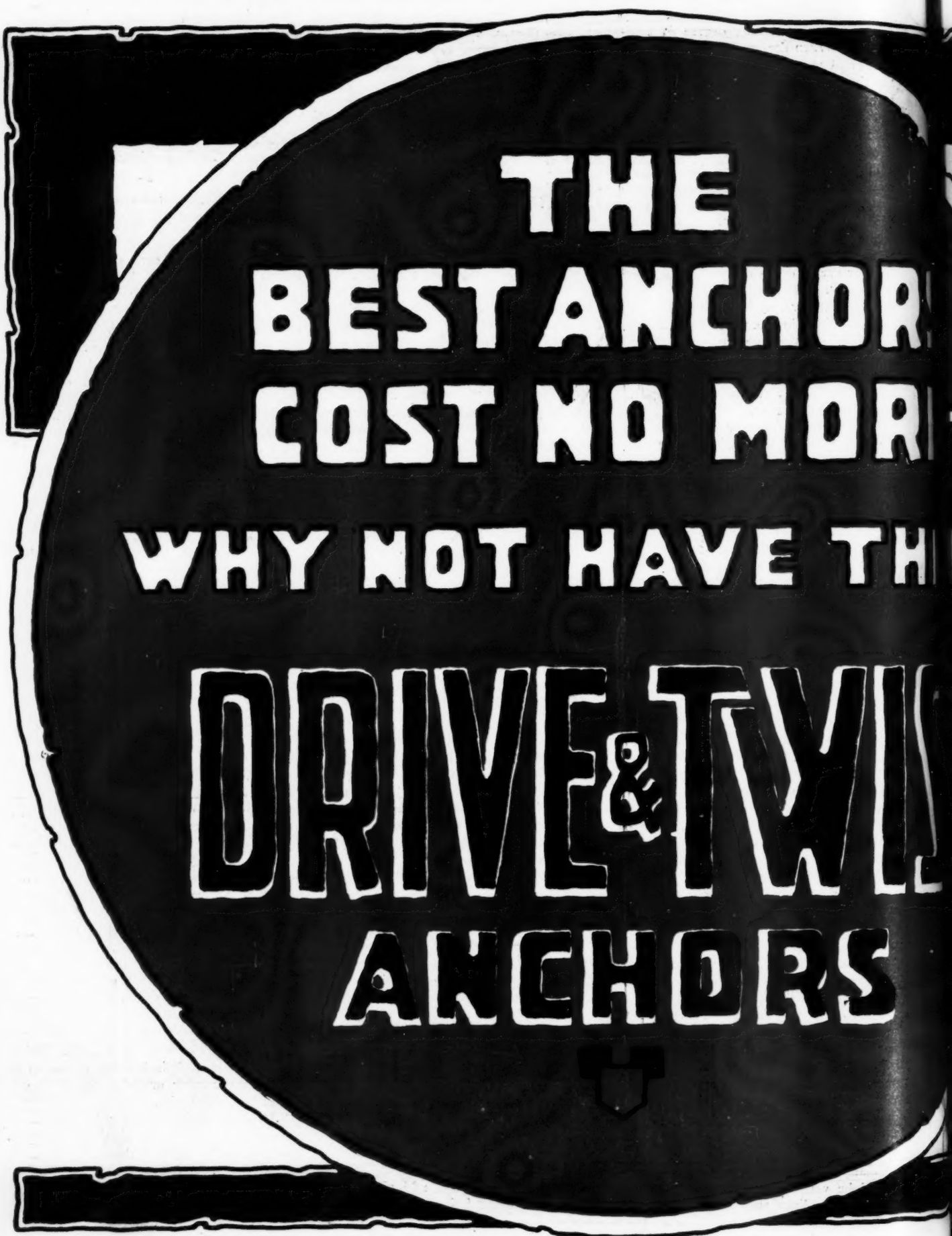
Celebrate Installation of 10,000th Telephone in Sioux City.

Sounding the keynote of service and dwelling upon what it has accomplished in the work of the Sioux City Telephone Co., more than 100 of the officers and employes of the company held a banquet recently at the West hotel, Sioux City, Iowa, to celebrate the installation of 10,000 telephones in the city. A similar banquet was given the employes when 5,000 had been installed. Howard Baker, president and manager of the company, presided.

Addresses were made by Hon. J. Adam Bede, of Minnesota, and E. A. Burgess, Sioux City, a director of the company.

Following the dinner the employes presented to Mr. Baker a diamond Elk button. In a response Mr. Baker dwelt upon the loyalty of the employes and officials in giving the city and the company the best service possible in building up one of the most necessary organizations to the life of the community.

E. A. Burgess followed Mr. Baker with a short address on behalf of the board of directors, declaring that the success was due to the good fellowship that existed between officers and employes. Mr. Bede outlined the growth of modern inventions in an address upon "Progress."



Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Heavier Stronger Better Materials Easier to Install Better Workmanship Greater Holding Power.

Yet they cost no more than those you have been using

Drive and Twist Anchors can be used in impossible places and without defacing the appearance of property. They are just the anchors for crowded corners, alongside buildings, in paved streets or private lawns. Simple to install, after they are driven to the required depth a bar is inserted in the eye and twisted three revolutions to the right, which spreads the wings in solid **"undisturbed"** earth.

This solid drop forged anchor has no welds nor cast iron parts. Spear shaped steel points protect folding blades from ground and rocks. **Can be installed in any kind of soil and in less time than any other form of anchor.** Only one man, one minute, with sledge and bar required.

NET PRICES IN DOZEN LOTS

No. 1—For Light Guy Work ....$1.20 each
No. 2—For Medium Guy Work. 1.95 each
No. 3—For Heavy Guy Work... 2.40 each

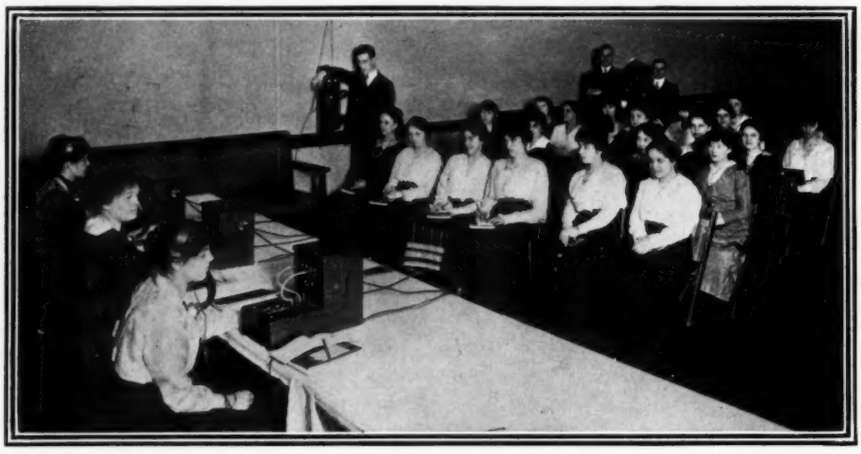
Gund Mfg. Co.
LA CROSSE, WIS.

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Pennsylvania's Operator Schools

State-Wide Operators' School Campaign Now in Progress Under Auspices of Eastern Traffic Association of Independent Telephone Companies—Plan to Reach Every Independent Company in Pennsylvania Operating Toll Lines

A campaign embracing the state of Pennsylvania, having for its purpose the holding of schools of instruction for Independent toll and long distance operators, is now going forward under the auspices of the Eastern Traffic Association of Independent Telephone Companies. Schools have been scheduled over the entire state and the work divided into two series, one covering the eastern half and one the western half of the state. These two series of schools are progressing simultaneously.



Operators and Instructors Hard at Work in the Operators' School at Allentown, Pa.

The long distance operating rules issued by the United States Independent Telephone Association are being used in this school campaign.

The series in the eastern end of the state is being conducted by W. H. Hay, state service engineer of the association, and that in the Western Pennsylvania territory by the travelling chief operator of the association, Mrs. Nancy D. Baines, formerly chief operator for the Federal Telephone & Telegraph Co., of Buffalo, N. Y.

In carrying out the fundamental idea under which the United States' operating rules were issues — that of providing the most economical and most effective system of operation and of striving for complete standardization of long distance operating practice for all Independent telephone lines in the United States — it is the aim of the Eastern Traffic Association, in launching this plan of educational work, to reach and interest every Independent telephone company operating toll lines in the state of Pennsylvania.

To this end, school centers have been so scheduled that a short trip will suffice to bring any Independent operator to some one of these schools. It is the hope that all Independent companies, whether members of the Eastern Traffic Association or not, will provide their operators with the United States rule book and send them to participate in this movement.

The schools as planned, some of which have already been held, are as follows:

EASTERN SECTION.

Location and date.
Philadelphia — March 1, 2 and 3.
Allentown — March 5, 6 and 7.
Reading — March 8, 9 and 10.
Lancaster — March 19, 20 and 21.
York — March 22, 23 and 24.
Chambersburg — March 26, 27 and 28.
Harrisburg — March 29, 30 and 31.
Bellefonte — April 9 and 10.
Williamsport — April 11 and 12.
Sunbury — April 13 and 14.

Those in Attendance at the Operators' School Held in Reading, Pa.

Hazleton — April 16, 17 and 18.
Scranton — April 19, 20 and 21.

WESTERN SECTION.

Washington — February 15, 16 and 17.
Pittsburgh — February 19, 20 and 21.
Butler — February 26, 27 and 28.
New Castle — March 1, 2 and 3.
Uniontown — March 5, 6 and 7.
Connellsville — March 8, 9 and 10.
Johnstown — March 12, 13 and 14.
Somerset — March 15, 16 and 17.
Kittanning — March 19, 20 and 21.
California — March 22, 23 and 24.
Oil City — March 26, 27 and 28.
Meadville — March 29, 30 and 31.
Erie — April 3, 4 and 5.
Warren — April 6 and 7.
Ridgway — April 9, 10 and 11.
Altoona — April 19, 20 and 21.

In the eastern end of the state, several schools have already been held, among which was one in the Race Exchange building, of the Keystone Telephone Co., of Philadelphia, one in Allentown, Pa., in school quarters provided by the Consolidated Telephone Co., and one in the building of the Consolidated Telephone Co., at Reading, Pa.

The school held in Philadelphia under the supervision of the Keystone company was well attended, the total attendance for the entire period being 111 operators. Operators of the Eastern Telephone & Telegraph Co., from numerous towns in New Jersey, of the United Telephone & Telegraph Co., Consolidated Telephone Co., and Bethel & Mt. Aetna Telephone & Telegraph Co., from towns in Pennsylvania, were present as well as operators from the long distance board of the Keystone company and those representing its outside exchanges. Much interest was manifested by the operators in attendance, a spirit of company loyalty and a desire to learn and put into effect the new rules being evident.

At the Allentown school, despite severe weather conditions, operators from the Blue Mountain Telephone Co., of Bangor,

Pa., were present, in addition to those of the Consolidated exchanges scheduled for this school, the total attendance being 63.

At the Reading school, a more numerous representation of connecting companies was in attendance, there being present operators from the Enterprise Telephone & Telegraph Co., of New Holland; Conestoga Telephone & Telegraph Co., of Birdsboro; Bethel & Mt. Aetna Telephone & Telephone Co., of Mt. Aetna, and the United Telephone & Telegraph Co., with a total attendance of 79 operators.

Managers and traffic officials are rendering splendid co-operation in this work.

In the western territory schools have been conducted by Mrs. Baines at the following points and under the supervision of the various companies as named:

Pittsburgh — Pittsburgh & Allegheny Telephone Co.

Washington — Chartiers Telephone Co.

Butler — Peoples Telephone Co., of Butler.

New Castle — Union Telephone Co., of Erie.

Uniontown — Tri State Telephone & Telegraph Co.

Johnstown — Johnstown Telephone Co.

Somerset — Somerset Telephone Co.

At the New Castle school, Miss Ruth Wagner, chief operator of the Youngstown office of the Ohio State Telephone Co., and Miss Anne Flaherty of the same office were present as visitors. The same spirit of enthusiasm on the part of the operators and co-operation by the management of the various companies is being shown.

It is to be hoped that in carrying out the broad schemes of standardization, which is constantly progressing among Independent telephone companies, all such companies will lend their hearty co-operation to this school plan, so that complete standardization and uniformity of operating practice for Independent long distance lines may become an assured fact in the state of Pennsylvania.

Annual Report of A. T. & T. Co. Issued

Bell Companies Show Largest Growth in History—Estimated Total of Telephones in United States at Beginning of Year Is About 11,300,000—Financial Statements of Associated Bell Companies and American Company

The annual report of the American Telephone & Telegraph Co. was given out last week. It shows the growth of the Bell system in toll wire mileage, in subscribers and in telephone connections to have been larger than in any previous year.

The number of telephone stations on December 31 was 9,847,192, an increase during the year of 695,971, of which 577,380 were owned by the Bell companies and 118,591 were Bell connected stations. It is estimated that there are about 11,300,000 telephone stations in the United States of which 4,800,000 are owned by Independent companies, or associations, and 6,500,000 by the Bell organization. It is stated that there are 3,301,702 connecting stations.

A section of the report is devoted to the Western Electric Co.

"The relations with the Western Electric Co. have been attacked from various quarters, and always from the questionable standpoint of self-interest," says Mr. Vail. "This relation, which we have described in previous reports, particularly in the report for 1914, is substantially that of a 'manufacturing department' of the business, indispensable to every enterprise which requires the manufacture for its own use of such a variety and magnitude of apparatus and equipment of 'special,' highly-technical and continually-changing character, which cannot be procured or provided for in the open market.

"That this manufacturing should be closely associated with the business as a part, or a division, is particularly necessary, the development is continuous, the ideas and suggestions for improvements very largely originate in the operation, in the investigation of the operation, in the course of experimentation or in the course of manufacture.

While it is a positive fact that it is impossible to procure from others the same character of manufacture or goods at less cost than from the Western Electric Co., or many of them even at any price, yet first cost cannot be made the deciding factor in the purchase of equipment so delicate and perishable as the telephone equipment. Depreciation and high maintenance will soon offset a very considerable saving in original expenditure. High-class service and low-class equipment do not co-ordinate.

These relations are considered by impartial and well-qualified experts to be the most effective for their purpose, which is the production of apparatus of high efficiency, reasonable first cost, and low cost of maintenance. This can be accomplished only by the close co-operation between the operating companies, the technical departments, and the manufacturing company.

Every requirement of the service, every possible improvement in apparatus from the operating point of view, is as a consequence of this co-operation, embodied in the output of the manufacturing company. The result is that the apparatus is just as near what is wanted as it can be made. It is obvious that this must be so. This production requires a complete knowledge of the present requirements of the service, and exhaustive study of the present requirements of the service, an exhaustive study of the future requirements.

No manufacturing company, not holding this relation, could possibly afford this close co-operation with the operating company, nor could any operating company afford to allow any other manufacturing company such an intimate hold on the development of its equipment.

Our associated companies are not under any obligation or coercion to buy of the Western Electric Co., but they do buy practically all of their requirements from that company, because they know that its product is made under the above-described conditions. As other companies connect with our system, or otherwise become acquainted with these conditions, they are inclined to the same course, but they are neither obliged nor coerced to. For the same reason that the Western Electric Co.'s product is what our companies want, it is what others want.

It is contended that this creates a condition which is unfair, in that other manufacturers are unable to sell to the Bell companies. What is there unfair about any enterprise requiring the expenditure of large amounts of money for highly-specialized machinery and equipment vital to its operation maintaining its own manufacture? Why should not the ideas and suggestions originating within the system be worked out within the system itself?"

The total operating revenues of the Bell telephone system for the year ended December 31, 1916, were $264,600,000, the largest total in the company's history. This is an increase of $30,151,000, or nearly 13 per cent. over last year. After deducting expenses the gross income was $79,353,000, an increase of 14.1 per cent over 1915. Of this amount $22,114,000 was paid for interest, rents, etc., leaving $35,160,000 for dividends and over $22,000,000 to be added to surplus.

Surplus after charges was $38,013,277, equal to 9.61 per cent. on the $395,635,619 capital stock, against 9.09 per cent on $380,477,100 capital stock in 1915. The total represents an increase of $394,440.

The net earnings of the American Telephone & Telegraph Co., separated from the rest of the Bell system, were $44,743,376, an increase of $3,625,889. The company's balance sheet shows that investment in stocks, bonds and notes of associated companies increased $21,845,830, and in permanent plant $5,041,396. The increase in current assets of $37,185,134 and in cash of $35,367,105 reflected the financing of December, 1916. There was carried to reserves of the American Telephone & Telegraph Co., alone, $2,500,000, and to surplus $4,391,090.

The combined balance sheets and income accounts of the Bell system compare as follows:

INCOME ACCOUNT.

	1916.	1915.
Exchange revenues	$188,888,149	$169,155,944
Toll revenues	72,971,668	62,929,980
Miscellaneous revenues	2,715,463	2,338,431
Total operating revenue	264,575,280	234,424,355
Depreciation	49,631,966	44,586,841
Current maintenance	34,923,549	31,171,272
Traffic expenses	53,748,707	45,785,432
Commercial expenses	25,698,913	23,583,274
General and miscellaneous expenses	11,902,470	11,049,191
Total operating expenses	175,905,605	156,176,010
Net operating revenues	88,669,675	78,248,345
Uncollectible revenues	1,480,502	1,703,210
Taxes	14,916,448	13,001,903
Operating income	72,272,725	63,543,232
Net non-operating revenue	7,080,384	6,022,932
Total gross income	79,353,109	69,566,164
Rent and miscellaneous deductions	3,735,470	3,384,407
Interest deductions	18,378,931	18,095,643
Total deductions	22,114,401	21,480,050
Balance net income	57,238,708	48,086,114
Deduct dividends	35,160,119	32,897,065
Surplus earnings	22,078,589	15,189,049

BALANCE SHEET.

Assets.

	1916.	1915.
Telephone plant	$946,293,248	$880,068,520
Supplies, tools, etc.	24,032,099	15,951,582
Receivables	66,029,580	43,518,625
Cash	80,692,829	45,716,330
Stocks and bonds	81,815,476	72,652,646
Total	$1,198,863,232	$1,057,907,703

Liabilities.

Capital stock	$ 463,101,569	$ 440,711,200
Funded debts	422,586,617	353,236,464
Bills payable	3,738,451	2,404,920
Accounts payable	38,280,436	29,039,127
Total outstanding obligations	927,707,073	825,391,711
Employes' benefit fund	9,151,000	9,114,329
Surplus and reserves	262,005,159	223,401,663
Total	$1,198,863,232	$1,057,907,703

There was much more money spent last year for the additions to plant, etc., than at any time since 1912, and, with the exception of that year and 1906, was the largest in the company's history. There was spent $66,224,700 during the year for that purpose. It is now proposed to expend $90,000,000 in 1917, which will break all records for the additions to the company's facilities.

The company has over 70,000 stockholders, not counting 43,000 employes who are buying shares on an installment plan. A majority of the company's shareholders are women. Less than 2 per cent. of the stock is held abroad, and less than 5 per cent. is in the hands of brokers. There was an increase of 5,043 in the number of shareholders during the year, there being more than 62,000 holders of less than 100 shares each.

The financial statements of the American Telephone & Telegraph Co. for the year compare as follows:

INCOME ACCOUNT.

	1915.	1916.
Dividends	$25,662,616	$26,710,690
Interest and other revenue from associated companies	13,407,976	14,529,978
Telephone traffic, net	6,544,462	8,136,314
Other sources	1,194,299	1,555,067
Total	$46,809,354	$50,932,051
Expenses	5,691,867	6,188,674
Net earnings	$41,117,487	$44,743,376
Deduct interest	6,498,849	6,730,098
Balance	$34,618,637	$38,013,277
Deduct dividends	29,100,591	31,122,187
Balance	$ 5,518,046	$ 6,891,000
Carried to reserves	$ 2,500,000	$ 2,500,000
Carried to surplus	3,018,046	4,391,090
Total	$ 5,518,046	$ 6,891,090

BALANCE SHEET.

Assets.

Stocks of associated companies	$452,390,925	
Bonds and notes of associated panies	68,088,355	
		$520,479,281
Telephones	$ 16,779,577	
Real estate	508,400	
Office furniture and fixtures	215,902	
Long distance telephone plant	53,457,978	
		$ 70,961,858
Trustee — Employes' stock-purchase plan		9,153,950
Special demand notes	$ 21,520,000	
Current accounts receivable	15,408,692	
		36,928,692
Temporary cash investments	$ 20,000,000	
Cash and deposits	65,237,660	
		85,237,660
Total assets		$722,701,443

Liabilities.

Capital stock	$395,603,600	
Capital stock installed	32,019	
		$395,635,619
4 per cent collateral trust bonds, 1929	$ 78,000,000	
5 per cent collateral trust bonds, 1946	80,000,000	
5 per cent Western Telephone & Telegraph Co. bonds, 1932	9,985,000	
4 per cent convertible bonds, 1936	3,127,000	
4½ per cent convertible bonds, 1933	13,890,100	
4½ per cent coupon notes, 1918	15,455,000	
Notes to associated companies	1,700,000	
		202,157,100
Dividend payable January 15, 1917	$7,912,072	
Interest and taxes accrued, but not due	2,783,840	
Current accounts payable	2,177,966	
		12,873,878
Employes' benefit fund		2,000,000
Reserves for depreciation and contingencies		31,092,679
Surplus (including capital stock premiums and excluding debt discount and expense)		79,002,166
Total liabilities.		$722,761,443

Note—$34,709,000 coupon notes of associated companies, indorsed but not owned by this company, are not included above in either assets or liabilities.

Monthly Statement of Earnings of Keystone Company.

The Keystone Telephone Co., of Philadelphia, Pa., has issued it comparative statement of earnings for the combined companies for the month ended February 28, 1917, and the two months ended on that date, as follows:

	Feb. 28, 1917.	Year previous.
Gross earnings	$127,570	$117,725
Operating expenses and taxes	63,497	58,542
Net earnings	64,073	59,183
Less interest charges	27,791	27,453
Net surplus	$ 36,282	$ 31,730
For Two Months.		
Gross earnings	$255,102	$234,834
Operating expenses and taxes	131,257	116,940
Net earnings	123,845	117,894
Less interest charges	55,584	54,906
Net surplus	$ 68,261	$ 62,988

P. B. X's in Service in Chicago.

During 1916 more than 300 private branch exchanges were installed by the Chicago Telephone Co. This brings the total number now in service up to nearly 1,000.

Meeting in Southern Indiana

Annual Convention of Southern Indiana Independent Telephone Owners' Association Held Last Week at French Lick—Legislative Matters Discussed and Relations with Public Considered—Co-operation Spirit of Meeting

The annual meeting of the Southern Indiana Independent Telephone Owner's Association was held March 13, at French Lick, Ind. It was well attended and was presided over by President S. M. Isom, general manager of the Mitchell Telephone Co.

The address of welcome was made by Professor B. O. Wells, superintendent of the city schools, French Lick. He assured the president and those present, that the Star City Telephone Co., at French Lick, gave to the public a high class of service and that he was pleased to be able to compliment it on the efforts that had been put forth in building up such a complete telephone system.

M. F. Hosea, traffic manager of the Indianapolis Telephone Co., responded to Professor Wells. He stated that all of the members present were very much pleased to receive such a warm welcome upon their arrival at French Lick.

At the suggestion of President Isom, Mr. Hosea explained to the members the splendid work that had been done by the officers of the association during the recent legislature. He stated that Mr. Isom was in Indianapolis a great many times in the interest of the association and thanked the members for the support that they had given to legislative

Phillip Dilly.

matters through the various lines of communication.

Mr. Hosea went into detail in reference to H. B. 320, which changed the time of making fiscal state reports to conform with the federal reports. This one bill will save all of the telephone companies a great deal of trouble and work, inasmuch as both federal and state reports can now be made at the same time.

Reference was also made to H. B. 434, which was intended to broaden the jurisdiction of the commission beyond mu-

S. M. Isom.

nicipalities. This bill was favored throughout the session but failed to pass on the last night on account of a lack of constitutional majority. The vote was 23 to 13.

S. B. 204, which was opposed by the Bell interests, was passed. It repeals the law making stockholders of Indiana telephone companies liable for twice the face value of their stock in case of failure. This bill attracted attention of the leading newspapers in Indianapolis and Mr. Hosea read extracts of articles published which commented upon the Bell's activity to defeat the bill.

These articles were read by Mr. Hosea to show the members of the association that the old-time feeling of the monopoly never fails to show up when there comes a time that it can do injury to Independent interests. This senate bill, 204, repealed an act of 1881. This act undoubtedly was introduced and fathered by the Bell company, and was just one of the stumbling blocks placed in the progress of the Independent telephony. The Bell company, organized in foreign states, was a foreign corporation and was not affected by the double liability, while the domestic company was forced to come under the law. Each stockholder of the Independent companies was doubly liable while stockholders of the Bell company were only singly liable. This, of course, is unjust and was undoubtedly discriminating.

Mr. Hosea displayed the new telephone directory just published by the Indianapolis Telephone Co., which became effective March 17, when the old manual board in Indianapolis went out of existence and the new automatic took its place. He advised those present that the Indianapolis company would install on all lines directly connected to Indianapolis, the automatic dial. This will enable these stations to reach subscribers in Indianapolis direct without the aid of an operator, and will advance the efficiency of the service 50 per cent. is Mr. Hosea's belief.

The next address was by Samuel Tomlinson, president of the Winona Telephone Co., of Plymouth, on the subject, "Association." Mr. Tomlinson first discussed what can be learned by association.

"There is always something to be

Fred R. Parrett.

learned, or some information you can impart," said Mr. Tomplinson, "and it can't all be done at one meeting, so I again urge you to be a faithful attendant." Taking up the matter of what can be accomplished by association, the one big problem which Mr. Tomlinson sees

is that relative to laws regulating telephone companies. There is a great need for telephone men to stand together on legislative matters.

In closing, Mr. Tomlinson said: "What we need is to realize that we are not Independent, but that we are very dependent. Every exchange in this state is a feeder of toll lines just as every branch of the railroads feeds some other, and in turn every exchange in the state is a possible feeder of your toll lines."

Those at Annual Meeting of Southern Indiana Independent Telephone Owners' Ass'n.

The next speaker was J. K. Johnston, of Indianapolis, who spoke on "Relations to the Public." Mr. Johnston brought out that there are few reasons why any corporations should make enemies, while there are hundreds of reasons why they should make friends. The spirit of the active management and the attitude of the employes of a company has much to do with its relations with the public. Mr. Johnston advocated the application of personality by every employe of a company, thus making friends for the company and making it popular.

The following officers were elected: President, S. M. Isom, of Mitchell, president and manager, Mitchell Telephone Co., Mitchell; vice-president, Phillip Dilly, of Huntingburg, treasurer-manager, Dubois County Telephone Co.; secretary-treasurer, F. R. Parrett, of Princeton, manager and treasurer, the Princeton Telephone Co.

Including these officers, the directors were elected as follows: J. C. Flint, owner of the Odon Telephone Co., Odon; Edward Plummer, manager of the Star Telephone Co., French Lick; L. C. Griffitts, president Seymour Mutual Telephone Co.; Isom Ackerman, manager of the Loogootee Telephone Co., Loogootee; C. R. Head, general manager, Pike County Telephone Co., Petersburg; E. W. Swarthout, president Aurora Telephone Co., Aurora.

The next meeting will be held in Princeton on June 19. All Independent telephone companies in Southern Indiana are invited to attend as are also Independent telephone manufacturers.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Argument on Colorado Franchise Case Before Supreme Court.

Final argument of the case of the people of Denver, Colo., against the Mountain States Telephone & Telegraph Co., for occupying the streets and alleys of the city without a franchise was begun before the Colorado Supreme Court on March 12.

The case was brought originally about five years ago. After his election to the office of district attorney, John A. Rush pushed it vigorously. The suit was one of quo warranto, asking by what right the telephone company occupied the streets and alleys of Denver without a franchise voted by the people. The telephone company in its answer set up that its franchise was perpetual and that it had been granted by congress during territorial days.

Judge Denison ignored this answer of the telephone company and issued a writ of ouster against it, declaring, in effect, that the telephone company was trespassing upon the streets and alleys of Denver. Against that order of Judge Denison the telephone company appealed to the state supreme court.

At the hearing begun before the supreme court last week attorneys Chas. R. Brock, Milton Smith, Floyd Walpole and Elmer Brock appeared for the telephone company, and Thomas A. McIntyre, John A. Rush and Omar Garwood were present on behalf of the people.

Mr. Brock spoke for two hours at the opening session. He declared that the company never claimed to possess any more exclusive right to the streets of the city than any person or any other corporation would have under the circumstances.

"The city from the beginning has acquiesced without a single protest to the right of the telephone company to construct lines and operate in the streets," said he. "The city has collected fees annually from the company under that right. No steps have ever been undertaken before to question that right."

At the afternoon session Mr. Rush appeared on the witness stand. He made a lengthy and powerful argument against the telephone company, traversing the historical development of the telegraph and telephone, and relating the views which courts have taken, in many cases regarding the rights of corporations operating under those inventions in the public service.

Mr. Rush questioned the legality of the council's action, saying the franchise was given by resolution and not by ordinance.

"Even if that franchise were legal," he stated, "it expired in 1897, and since that time the telephone company has been usurping the streets of Denver without the slightest legal authority."

Stipulation for Physical Connection at Thief River Falls.

The Minnesota Railroad & Warehouse Commission, on March 19, issued an order requiring the Tri-State Telephone & Telegraph Co. to connect its local exchange at Thief River Falls, with the toll lines of the Northwestern Telephone Exchange Co. pending the final decision in the Owatonna physical connection case.

This case came before the commission on complaint of the city of Thief River Falls asking that connection be ordered between the local Tri-State exchange and the toll lines of the Northwestern company. The commission thereupon issued an order requiring the respondents to satisfy the petition of the complainant or show cause why such relief should not be granted, which answers were duly filed by the defendants.

A date for the trial of the cause was fixed by the commission, at which it appeared to be the desire of all parties to avoid the taking of testimony therein for the reason that a similar case had been tried by the commission and appealed to the district court. The case in question is that of the city of Owatonna vs. the Northwestern Telephone Exchange Co., the commission's ruling in which was published in TELEPHONY of February 10.

Pending the appeal of the Owatonna case, the parties in this case were willing to enter into a stipulation providing for the issuance of an order of the commission similar to that in the Owatonna case, directing connection between the exchange of the Northwestern company at Owatonna and the toll lines of the Tri-State company.

In order to avoid the apparently unnecessary work of taking testimony in this case pending the final decision of the appeal in the Owatonna case, it was therefore ordered and stipulated by and between the respective parties that the commission enter an order substantially the same as that issued in the Owatonna case, the order to be effectual during the pendency of the appeal and subject to such modifications or change as any party thereto may be rightfully entitled, by reason of the final decision entered in the Owatonna case.

The order in this case provides:

That the expense of making such physical connection or connections and the maintenance thereof be apportioned equally between sad companies.

That the Northwestern Telephone Exchange Co. pay to the Tri-State Telephone & Telegraph Co. a service charge of five cents for each "in" and "out" message, the charge to be absorbed from the rate.

That an additional charge of ten cents be added to each toll line message moving over the toll lines of the Northwestern company, to or from subscribers' stations of the Tri-State company, at Thief River Falls, the charge to be paid to the Tri-State company and not to be absorbed from the rate.

This order becomes effective 30 days from date thereof.

Commission Issues Order in Elyria (Ohio) Rate Case.

The Ohio Public Utilities Commission, on March 14, handed down its decision in case No. 722, the City of Elyria vs. the Elyria (Ohio) Telephone Co., in which it was alleged that the defendant's rates were excessive and unreasonable and that the service was inadequate and inefficient.

After making an appraisement of the company's property, the commission found the following rates to be just and reasonable, which the company is authorized to establish and collect:

Individual line business service, $3.25 per month, subject to discount of 25 cents, if paid by the 10th of the month.

Extension telephone (business) $6 per year; extension bell, $3 per year. Extra user, exchange service (business) $6 per year.

Individual line residence service, $2.25 per month, and four-party line residence service, $1.50 per month, both rates subject to discount.

Four-party line beyond city limits, $1.75 per month, subject to discount.

Eight-party line rural, $1.75 per month, subject to discount.

Extension telephone (residence) 50 cents per month; extension bell, 25 cents per month. Extra user, exchange service (residence) 25 cents per month.

Private branch exchange service: First trunk line, $36 per year; second or last trunk line, $30 per year; additional trunk lines, $36 per year. Stations receiving city exchange service, 10 and over 5, each $12 per year; 25 and over 10, each $8 per year.

In regard to the complaint of inefficient and inadequate service, the company is ordered to:

(1) Install 16-volt lamps on the cord circuits in replacement of all ten-volt lamps now so installed;

(2) Readjust all line relays to operate with 500 ohms;

(3) Tighten all loose relays on mounting plates and replace missing caps;

(4) Establish and conduct routine tests of all answering jacks sufficiently to quickly disclose burnt-out lamps and faulty adjustment of relays;

(5) Charge and overcharge storage batteries in conformity to instructions of the manufacturers, and maintain gravity within prescribed limits;

(6) Overhaul all cable terminals, repairing loose connections and defective insulation of drop or bridle wires to conform to standard practice;

(7) Establish and maintain an adequate trouble record which shall disclose trouble and time reported, the trouble and time corrected, with provision for the submission monthly of a summary to the management for the solution of recurrent and preventable trouble, and

(8) So far as practicable, relieve the wire chief of routine work that his services may be available for maintenance, testing and the investigation of trouble.

Canadian Independents Seek to Amend Railway Act.

The Canadian Independent Telephone Association is preparing to take up the matter of legislation with a special committee of the dominion parliament appointed to amend the railway act. The committee is preparing an amendment which is now outlined, giving a joint board, in cases where questions arise between a company operating under a provincial franchise and a company operating under a dominion charter. This is something the association asked for, and the Ontario Railway and Municipal Board is supporting it also.

The dominion board ordered physical connection, but because the clause of the dominion railway act mentioned compensation if the board made such an order it calls upon a local company to pay an annual sum of from $100 to $300 as compensation for loss of business and also a surcharge of ten cents per call.

Now the Independents are asking that the act be amended, by eliminating entirely the word "compensation" and inserting an additional clause providing that every telephone user shall have the use of the long distance lines of any company by payment of the established long distance charges of such company without any surcharge, and without regard to whether such user is a subscriber or a renter of such company or otherwise.

It is also asked that where the board makes an order for the purpose of long distance connection only, the board, in deciding the terms upon which such connection is made, shall in addition to the physical condition of the system requiring connection take into consideration only the case of the company owning such system of extending to and terminating upon the switchboard of the long distance company and its connecting lines.

That means that the railway board cannot discuss the matter of connection; only in the case of the cost to be imposed upon the local company for bringing its lines to the Bell switchboard.

There is an amendment now before the legislature making a penalty of $25 or imprisonment for 30 days for any telephone operator or other person in the employ of a telephone company who divulges the purport or substance of any telephone conversation.

The same penalty is imposed upon anyone listening in upon the lines and overhearing a conversation and divulging anything of it. This affects those on party lines.

The sub-committee to amend the railway act meets on April 12.

Company Cannot be Forced to Divulge Information.

The Nebraska State Railway Commission has ruled, in two complaints recently filed, that a telephone company cannot be forced to make public matters that come to its managers and employes in the course of their employment. In one case a real estate man insisted that a company be compelled to inform him from whom a long distance call came during his absence from his office. The

call was canceled before he returned. The commission held that the company was within its rights in refusing because the call was initiated by another than the man demanding to know.

In the other case the company at Red Cloud asked the commission whether it should comply with the demand of a produce dealer that he be protected from a competitor. He said the latter was in the habit of calling up his place of business and asking what was being paid for produce, and when asked who it was calling he gave a fictitious name. He wanted the company to give him the evidence on which he could prove his belief, as it was in possession of the knowledge of where calls came from.

The commission held that it cannot order a telephone company to refuse a connection to a person desiring service. It held, however: "The annoyed dealer can ask the telephone company to notify him through its operators, when said annoying merchant presumes to get the annoyed one on the telephone for purposes against which he, the annoyed one, objects."

Nebraska Bell to Cancel All Four-Party Line Rates.

The Nebraska (Bell) Telephone Co. is canceling as rapidly as it reaches them, all four-party line rates on its exchanges. A number of applications for the privilege have been recently filed with the state railway commission.

The commission has indicated its entire willingness to have this done because, in the opinion of its members, such rates constitute a discrimination and for the reason that its studies show that these lines are rarely filled, that it is impossible to keep them filled where that has once been accomplished and that the average number of persons on all the four-party lines in the state is three. As a result the persons on these four-party lines get just as good service at a rate lower than paid by two-party line subscribers.

The four-party line schedule or device was a weapon of warfare employed by the Bell in early competitive days. A member of the commission said that the history of several exchanges located in cities where bitter competition once prevailed shows that the Bell, in order to get business from Independent competitors whose individual or two-party rate was lower, placed subscribers at low rates on four-party lines they agreed never to fill, and to keep the number on the lines as low as possible. The tendency of considerable numbers of subscribers to move from one neighborhood to another made the task of keeping them filled difficult anyway.

The Nebraska company has been granted the right to reduce rates at Doniphan, Alda, Cairo and St. Libory. The rates on individual line residences is reduced from $2.50 to $2 and on two-party lines from $2 to $1.50. The old four-party line rate of $1.50 is discontinued. The new rates make the schedule the same as at Grand Island where free service is given the towns named.

The Nebraska Bell has applied for permission to revise exchange rates at Wakefield and to change two-party residence rates at Howells. The application sets up that it desires to advance the rates at Howells from $12 to $15 in order to standardize rates and to remove a discrimination that exists against Schuyler and Clarkson in the same county. Eighty-two of its 92 subscribers have contracted for telephones at the new rate.

The Wakefield application asks for an increase of individual business telephone rates from $24 to $30 and individual residences from $12 to $18; and to make a two-party business rate of 24 and a two-party residence of $15. It also asks that it be permitted to make charges outside of the inner radius—meaning where service given near the city necessitates individual pole lines—$5 for individual telephones and $3 for two-party telephones.

The Wakefield exchange was purchased four years ago from the Northeastern Telephone Co., and while all telephones have been placed on one switchboard there has never been a consolidation of the outside construction. Rebuilding is now necessary and $15,000 will be spent in this and in substituting Bell instruments for the Independent equipment. A petition from 137 of the 200 Wakefield subscribers accompanies the application.

Status of Telephone Bills in the Nebraska Legislature.

The only bill affecting telephones that has passed either house of the Nebraska legislature so far has been the Adams bill in the senate. This gives cities of the second class the right to regulate the service and rates of all public utilities. It was opposed by the telephone and power companies on the ground that as their service is not confined to city limits the municipality will divide authority with the state commission, and that it is unworkable. The bill received just enough votes to pass.

The house killed more telephone bills during the past week. One limited to 25 years the grant of any right of way along highways; another gave cities of the second class and villages the right to regulate rates and service where the exchange service was confined within corporate limits and the other increased corporation taxes from 30 per cent. on the smaller companies to 1,000 per cent. on the larger.

The special senate committee to investigate the charge that the toll line companies were endeavoring to throttle toll rate legislation by secretly giving members free toll service has asked and been given ten more days. Its chairman said they had made a good start but had not had time to get down to close work.

Telephone men say that it is a flash in the pan, and that every legislator who has used long distance has either been billed for the service or the state has paid for calls over capitol telephones. They add that their belief is that it was intended by the author of the investigating resolution, Senator Wilson, to intimidate the companies opposing his air line toll rate message bill.

Work of Idaho Commission Little Impaired by Legislation.

The Idaho Utilities Commission, upon which a bitter fight was started when the present legislature opened its session, will escape without serious injury, for action of the two houses, March 8, shows that all the bills affecting the commission have been disposed of. Two of these extend its power by giving it supervision over jitneys and other automobile stages or vehicles run regularly over certain given courses for they are made common carriers and additional supervision over railroad crossings and accidents so as to prevent the latter.

Senate bill No. 106, by Thomas, and house bill No. 234, by the committee on agriculture, take certain powers away from the commission. The former excludes from its jurisdiction municipal public utilities, of which there are a number of Idaho. The latter excludes from its jurisdiction telephone companies not operated for profit. The latter is the farmer's bill and applies to the Rupert situation, principally. Both passed the legislature.

Section 48, the certificate and convenience clause of the commission act, which was attacked, remains intact.

Oregon Enacts Certificate of Public Convenience Law.

Oregon senate bill No. 165, which requires the issuance of a certificate of public convenience and necessity by the Oregon Public Service Commission prior to the beginning of any construction by a public utility in a field already served, has passed both the senate and the house and became a law by the signature of Governor Witchycombe on February 16.

This bill in effect protects the investment in public utility property by restricting invasion and preventing ruinous competition, while at the same time empowering the public service commission

to require line extensions to localities not already served.

Bill to Permit Michigan Cities to Operate Telephone Lines.

A resolution introduced in the Michigan legislature by Senator James A. Murtha, for a constitutional amendment by which municipalities might operate telephone systems, was voted out of both house and senate committees on constitutional amendment, with recommendation for passage.

The resolution was prepared in the office of Attorney General Groesbeck and is the direct outgrowth of that official's listening to the testimony in the hearings recently conducted by the railroad commission on the application of the Michigan State Telephone Co. for metered service in Detroit.

Hearings on Detroit Metered Service Case Closed.

The hearings before the Michigan Railroad Commission on the petition of the Michigan State Telephone Co. for permission to establish metered rates in Detroit closed on Tuesday, March 6, and it is expected that a decision in the matter will soon be handed down.

Summary of State Commission Hearings and Rulings.

ALABAMA.

April 11: Hearing at Montgomery in the case of City of Birmingham vs. Southern Bell Telephone & Telegraph Co., in which the city is asking for a reduction from the present rate of $3 for residence telephones and $6 for business telephones. The rates are alleged to be out of proportion to the capital invested and a reduction is demanded.

FLORIDA.

March 20: Hearing at Tallahassee in the matter of building and facilities of the Apopka Telephone Co. It is charged that the present building and facilities are inadequate and unsuitable.

CALIFORNIA.

March 9: Hearing on the complaint of the city of Burlingame against the Pacific Telephone & Telegraph Co., in which the city alleges that the telephone company has violated rates and rules for telephone service adopted by the city of Burlingame in July, 1915. The city wants a telephone exchange in Burlingame, a uniformity of rates and a reduction of all rates north of Burlingame avenue to those south of Burlingame avenue. The city also wants a separate heading for Burlingame in the telephone directory.

The telephone company, in its answer, admitted certain differences in charges for services in Burlingame, but said that all the rates are as filed with the commission, and that there is no need for a uniformity of rates in Burlingame, but, on the contrary, rates should be based upon a primary rate area.

The telephone company asked the commission to consolidate the complaint of Burlingame with the commission's general investigation of rates and rules of the telephone company throughout the state.

ILLINOIS.

March 7: In case of Stark County Telephone Co. and Empire Telephone Co. vs. Henry Telephone Co. and Interstate Independent Telephone & Telegraph Co., the commission authorized the petitioners to discontinue the so-called "Market" wire at Henry, where that part of the line belonging to the Empire Telephone Co. connects with that part of the line that is owned by the Henry Telephone Co.

At the hearing it developed that the service over the line in question is very poor, due to the length of the line, divided ownership and divided responsibility for its maintenance. As there is at present a toll line connecting Wyoming and Bradford with Peoria by a more direct route, the commission was of the opinion that the severance of the line in question would not interfere with service between those towns but would rather result in an improvement. Case 6251.

March 7: Commission authorized McHenry County Independent Telephone Co., of Spring Grove and Henry, to sell, and Farmers New Era Telephone Co., of Hebron and Richmond, to purchase, all of the properties of the former company for $7,000 in cash. The commission further ordered that the property to be acquired shall never be capitalized in an amount exceeding $7,000. Case 6268.

March 7: The commission dismissed the complaint of Robert A. Larrabee against the Coles County Telephone & Telegraph Co., relative to interference by the respondent with the poles, wires and service of the Ashmore Mutual Telephone Co. Case 5410.

March 8: Commission approved agreement between Wabash Railway Co. and Macon County Telephone Co., relative to underground telephone crossing near Boody. Case E-678.

March 20: Hearing at Springfield on joint application of Joy Switchboard Co. and Joy Telephone Co., for approval of sale of the former to the latter; also application of Joy Telephone Co. for certificate of convenience and necessity to operate in village of Joy and application for order authorizing the issue of $5,000 capital stock. Case 6120.

March 20: Hearing at Springfield on joint application of F. C. Orton for authority to sell and Macon Telephone Co. for authority to buy, the telephone plant of F. C. Orton in Macon, Ill., and vicinity; also application of Macon Telephone Co. for certificate of convenience and necessity to operate in Macon and application for order authorizing the issue of $4,000 common stock, $8,500 preferred capital stock and $12,500 of first mortgage 6 per cent. gold bonds and the execution of deed of trust to R. H. Woodcock, trustee. Case 6274.

March 21: Further hearing on complaint of City of East St. Louis of rates charged by Southwestern Bell Telephone Co. for telephone service in East St. Louis. Case 5100.

March 27: Hearing at Galesburg in the case of Galesburg Union Telephone Co. vs. Central Union Telephone Co., for physical connection and long distance connections.

KANSAS.

March 9: Hearing on application for permission to merge the Bell and Home telephone properties in Pittsburg. Intervening petition filed by Kinloch Telephone Co., of St. Louis, Mo., asserting that the value of many of its toll lines would be destroyed by the merger.

March 20: Hearing on application of Missouri & Kansas Telephone Co. for increase in rates in the city of Hutchinson.

MICHIGAN.

March 6: Final hearing on application of Michigan State Telephone Co. for permission to establish metered rates in Detroit.

MINNESOTA.

March 14: Stipulation reached in the case of the City of Thief River Falls vs. the Tri-State Telephone & Telegraph Co. and the Northwestern Telephone Exchange Co. and order entered requiring the Tri-State company to connect its local exchange at Thief River Falls with the toll lines of the Northwestern company, the order to be effectual during the pendency of the appeal in the Owatonna physical connection case. The order is subject to such modification or change as any party may be rightfully entitled, by reason of the final decision in the Owatonna case.

March 20: Hearing at Cokato on application of Knapp Telephone Co. for permission to increase rates.

NEBRASKA.

March: Application filed by Cuming County Independent Telephone Co., of Wisner, for permission to issue $16,700 of additional capital stock:

March 10: Hearing upon application of Daykin (Neb.) Telephone Co. for permission to increase business and residence rates 25 cents per month and metallic farm lines 50 cents. Company asked further time to prepare data, and case continued until such time as application is again set for hearing.

March 16: Application filed by Nebraska Telephone Co. for permission to revise exchange schedules at Wakefield and rates on two-party lines at Howells. Notice of application ordered sent to city officials and representative business men of two towns, and hearing set for April 3.

March 15: Application of Linwood Telephone Co. for permission to increase rates filed. Hearing fixed for April 4, and officials and interested parties advised. Application asks for increase of business rate from $1.50 to $1.75 and of residence and farm rates from $1 to $1.25.

March 14: Order issued granting application of Nebraska Telephone Co. to reduce residence rate schedules at Doniphan, Alda, Cairo and St. Libory.

March 15: Application filed by Nebraska Telephone Co. to cancel four-party rates at Boelus, Cushing and Elba.

OHIO.

March 14: In the case of the City of Elyria vs. the Elyria (Ohio) Telephone Co., the commission ordered the company to put into effect a new and revised schedule of rates and to institute certain repairs and reorganize its plant and operating organization. Case 722.

OKLAHOMA.

March 9: Mulhall (Okla.) Telephone Co. cited to come before the commission and show cause why it has not filed annual and semi-annual reports with the commission as provided by the rules of that body.

WISCONSIN.

March: Petition filed by Ashland Commercial Club for order requiring physical connection between toll lines of Home and Bell companies in Ashland.

March 20: Hearing on application of Badger Mutual Telephone Co. for authority to increase rates. U-1046.

March 21: Hearing on application of Red Granite Telephone Co. for authority to increase rates. U-1050.

March 23: Hearing in the case of Wisconsin Telephone Co. vs. City of Kenosha, relative to unreasonable city ordinance. U-999.

Indianapolis Is Now Automatic.

(Continued from page 14.)

may not care to dial the entire number. Simply calling the digit "9" will place the calling telephone in connection with a manual operator at the complaint switchboard, who will forward the number by means of the dial. Just how much traffic of this nature will be thrown upon the operating force cannot be anticipated, but if this traffic becomes too great for the facilities afforded by dial calling, machine methods will be employed, plans having been perfected for its use.

The private automatic exchange switchboard trunks will lead from fourth selectors instead of connectors, whereby only four digits will comprise the numbers of private automatic exchange subscribers. The fourth selectors are not installed at the present time, but will be installed in service within 60 days upon delivery of the subscriber's P. A. X. equipments.

Private automatic exchange operation is to be extensive. A number of contracts have already been entered into and the manufacture of the equipments is being rushed at the factory. This equipment will differ very radically in certain operative and service features from previous equipment of this general type. These features were introduced, as were the manual features, in connection with the major exchange, to give the human touch to the automatic insofar as it may be practical and desirable for service and commercial reasons.

New telephones were installed throughout the system with the automatic dials and the subscriber allowed to use this telephone, ignoring the use of the dial until the time of cut-over.

In order to familiarize the subscriber with the operation of the dial and for the advertising advantage to be incidentally obtained, a large manilla shipping tag was attached to each telephone, on both sides of which were printed suitable advertisements as to automatic service, and a very comprehensive description of the operation of the automatic dial set forth. It was suggested to the subscriber that he familiarize himself by practice with the operation of the dial, however, leaving the receiver on the hook while doing so. This has served the purpose intended.

The Subscribers' Instruments.

About 90 per cent. of the telephones used are of the portable stand type; the remainder are wall sets. The very latest and most efficient induction coil type circuit has been used throughout to afford transmission that may be a "little better than necessary" in some cases, but equal to the best practice for long distance service. Receivers on telephones are of the electromagnetic type. It has been deemed that any prestige that might accrue to the company through its long distance facilities would redound to the company's prestige as a provider of local service.

The company has put itself in the position of a local advertiser and has "sold itself" a liberal quantity of advertising space in its own directory, setting forth the advantages of the automatic in affording local telephone service and bringing to the attention of the general public its long distance facilities.

In order to avoid having to use improvised circuits for the private branch exchange switchboards, that would be suitable to automatic operation at the time of cut-over and also meet the operating conditions before the cut-over, it was deemed advisable to give temporary manual out-going service to private branch exchanges with the exception of a few that enter exchanges other than Main exchange, where practically all of the P. B. X.'s terminate.

To this end, a five-position temporary manual board was inserted in the trunks between the P. B. X. primary line switchboard and the line switches on the various secondary boards to which these trunks extend. Thus all outgoing calls from P. B. X.'s cause a lamp at Main office to glow, signaling the manual operator. This operator, by inserting a plug in a spring jack, can pass the call by means of the dial. All incoming P. B. X. business will be reached directly through the automatic connectors without the intervention of an operator.

To insure the most prompt attention to the calls from P. B. X.'s, signals come in in multiple on two positions. Though there are approximately 400 P. B. X. trunks thus entering Main office, there are only 100 trunks extending between the primary board and the operators' positions, the traffic being equally distributed by means of the line switches.

The pay stations are temporarily handled in the manual way, but it is planned to use an automatic prepayment coin box in the near future and thus do away with this operating position.

The Long Distance System.

The Indianapolis Telephone Co. has a very extensive long distance system, involving about 10,000 miles of wire, these long distance circuits leading in all directions from Indianapolis. Indianapolis, being located at the center of the state, is one of the most important long distance centers in the Middle West. At the present time there are about 80 long distance lines, owned by the company, entering the Main office where the long distance board is located. Plans are now formulated to extend the automatic feature to the operation of the long distance system, with the expectation that it will greatly improve service and increase the traffic capacity of its lines and operators.

Local subscribers obtain the recording long distance operator by simply pulling the digit "O."

Plans are under way for adding to the long distance manual switching equipment, to take care of the constantly-increasing toll traffic offered the company and to further improve the service afforded its patrons. Provision has been made for applying a discriminating tone on any desired subscriber's line, to be introduced at the time the long distance recording operator responds. This will prompt her to refer to records for special instructions.

In line with augmenting its toll traffic, every practicable commercial means occurring has been resorted to to call attention to this class of service rendered by the company. All automatic dials on telephones bear an advertisement as to long distance. The fronts of the transmitters will also bear an advertisement on a snugly-fitting celluloid disk made expressly for the type of telephones used.

In this connection the dials will also bear the information that fire and police are "No. 10." so that the automatic telephones will become the most logical means of sending in fire and police calls on the briefest notice and under almost any stress of mind of the calling party.

The Toll-Selector System.

To insure the very highest class of long distance transmission over toll service trunks, special toll first, second and third selectors are provided, the third selectors having access to the combined local and toll connectors previously referred to. In other words there is a complete toll-selector system independent of the local selector system.

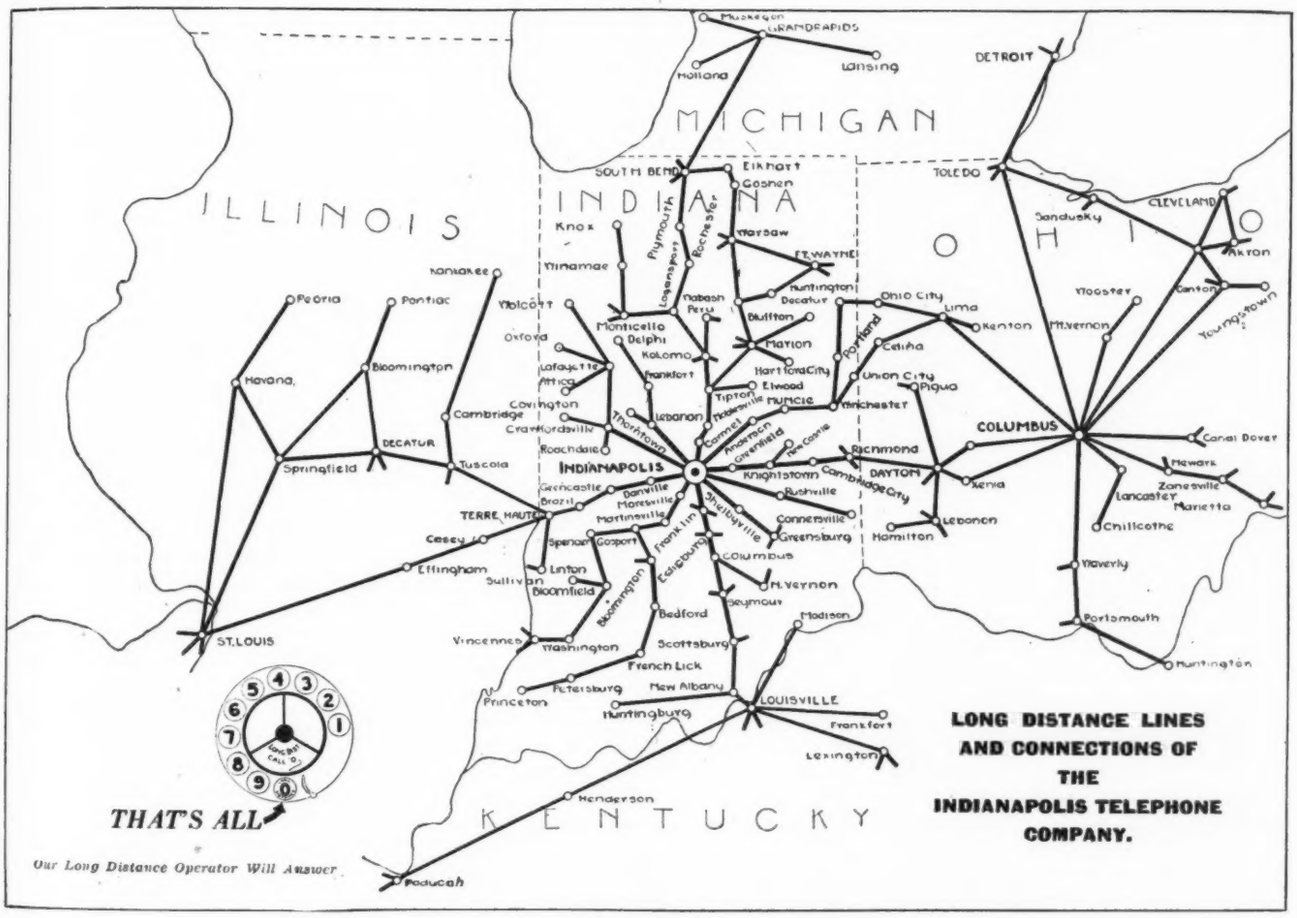
The toll first selectors are installed in Main office where the toll switchboard is installed. The toll second selectors are in main-branch offices and the toll third selectors are in the office that the subscriber's line terminates in. Thus in the case of a call to a main-branch office, the toll second and toll third selectors will be in that office; and in case of a call to a sub-office, the toll third selectors will be in that office.

The trunks outgoing to toll first and toll second selectors are three-wire and between the toll second and toll third are three-wire; between the toll third and combination local and toll connectors, they are five-wire. The impulsing is done over one of the auxiliary wires, and ringing is done across the talking pair by the toll operator and re-impressed in the frequency necessary to ring the subscriber's bell by a relay associated with the toll third selector.

The toll third selector also has introduced into it a repeating coil and the battery supply and ground to the called subscriber's transmitter is also applied at this repeating coil through 75 ohm relay windings. Thus the current output to

subscribers talking on long distance is increased over that used for local, as the local transmission is supplied through 200-ohm windings, one on each side. The auxiliary or dial-impulse wire also serves as a supervisory wire to the toll operator.

A departure from previous practice has been made in that multipled spring jacks on toll service trunks are not employed in the toll board, each section having its individual toll service trunks. In that way the likelihood of an interruption, through the operator inadvertently plugging into a busy trunk without observing the busy signal, is avoided. Also the operators are not charged with the caution



Map Showing Extent of the Toll Territory of the Indianapolis Telephone Co.

to avoid interfering with busy toll service trunks. It is assumed that this would produce better service generally.

Temporarily, however, there are five toll service trunks multipled between three sections of two operators' positions. These, however, are only used for overflow in case of an emergency and are in addition to five individual service trunks as just described.

There are 40 toll first selectors which are ample to handle the coincident traffic that would probably ensue, not only for traffic handled by the toll operators manually, but which might come in over the automatically-equipped toll lines. A secondary toll line-switch unit will be installed with a capacity of approximately 100 secondary line switches in groups of 25 each, accessible to ten trunks leading to toll first selectors.

The spring jacks of each section will then terminate on secondary line switches and will lead to toll first selectors from them. By the "staggering" of trunks leading from the spring jacks to the secondary line switches, there is little likelihood that there will be congestion.

The toll lines operating "automatic" will terminate in these same secondary line-switch groups, through suitable intervening equipments. However, primary line switches will be substituted for the secondary line switches, the units being designed so that they are readily interchangeable.

Battery and Power Equipment.

For furnishing the necessary electrical energy for operating the system, Main office is provided with 25 25-G cells, placed in tanks sufficient to allow of enlargement to 40-G, together with seven counter-electromotive force cells for controlling the voltage, the operating voltage being 48. The charging rate of these cells is 240 amperes. This would make the rating capacity 1,920 ampere hours.

The charging equipment consists of a 140-ampere capacity motor-generator set for emergency use, and three 50-ampere capacity each, mercury arc rectifiers of the G. E. make provided with special reactance for suppressing any "hum" that might otherwise be introduced into the talking circuits.

The plan of charging will be the floating of the batteries. Through the use of the three mercury arc rectifiers it will be possible to adjust the charging rate to the load. In other words, it is not intended that the batteries shall discharge, but that they shall constantly contain the maximum charge and thus have available the maximum reserve.

The usual plan of "exercising" the batteries by successive charges and discharges will not be practiced, though overcharge to a reasonable degree will be periodically practiced in order to insure all cells being kept in a uniform condition as nearly as possible.

There is nothing special in the battery equipment of the other offices beyond the fact that mercury arc rectifiers are used for charging with the exception of East office, which employs a motor-generator set previously used there.

The practice of floating the batteries will be followed as closely as possible in the smaller offices, but, obviously, it will not be practicable to carry this plan out as religiously as it can be carried out

in Main office where the current demand is much greater.

The power board in Main office is located on the second floor convenient to the wire chief's desk. This relationship also exists in the other offices. A novel arrangement was introduced by the manufacturers in placing many of the relays and fuses controlling miscellaneous circuits on this board, simplifying operation and reducing the amount of miscellaneous wiring throughout the switchroom. This also has to do with signal relay and "interrupter-start" relays in connection with applying ringing power to the connector switches.

Telephone Maintenance Provisions.

Telephone maintenance is handled from the Main office. The equipment for making the necessary tests consists of a four-position wire chief's desk, standing height, with provision for sitting at the convenience of the testers. It is located near the intermediate distributing frame and the main distributing frame. Each tester's position has its special key for answering and outgoing service from and to troublemen, complaint and information desks, etc., and is wired for two voltmeters for each tester's position; one is a high-resistance voltmeter for insulation tests and the other a low-resistance voltmeter for loop tests. These are at the left of keys, so the testers avoid raising their eyes to observe deflections.

The keys and lamp signals are in the keyshelf in front of each attendant. Pilot lamp signals and an auxiliary telegraph sounder are provided, associated with the lamps, the latter to audibly apprise the attendant that a lamp is glowing. This feature was included to relieve the strain of watching for signals as much as possible and also to insure the most prompt response on the part of the attendants.

Each main-branch office is provided with a one-position wire chief's desk and associated equipment, and each sub-office is provided with wall-type testing equipment suitable for its needs. Under normal conditions the testing will be handled from Main office from special test distribution trunks. Three such trunks are allotted to North office; two to South office; two to East office and two to each of the sub-offices.

One of these trunks is provided for each main-branch office loop through the wire chief's desk in the respective offices, so that the local wire chief will have access to the test distributor trunk. Provision is made in the circuits so that an attendant seeking to use a trunk will be apprised of its being otherwise in use by a local tester, if it is so. The usual provision for trunks to test shoes at the racks are provided as well as order wires to the various offices, etc.

The complaint and information service is furnished from the Main office, the desks being located near the wire chief's desk. There are four information desks and two complaint desks of the table type. The trunks incoming and outgoing are key-terminating and on the complaint desk key-extending. The lamp signals are in the keyshelves and, like the wire chief's desk, have a telegraph sounder to audibly apprise the operator simultaneously with the pilot lamp glowing. It was deemed that this latter expedient would greatly reduce the amount of tension and nerve strain on the operators and insure prompter responses to calls.

The complaint and information trunks are in mutiple relation so that the operators are enabled to assist each other. A party calling the complaint desk, stating that he cannot reach a certain number, may, if desired, be switched forward by the complaint operator by manipulation of the dial at her position. The complaint operator, by being able to route the party through a different set of switches, may thus be able to complete the call, if the subscriber has himself encountered a defective switch in the chain.

Information Operators' Equipment.

The information operators are provided with card files that allow them to give the telephone number from an address, and the subscriber's name from a telephone number. They are also provided with a directory from which she can give a telephone number from a subscriber's name and address. From the street files, she is also enabled to give the number of the nearest telephone to the party sought.

The complaint and information desks are arranged so that the work can be concentrated onto one position for night service and the others are out of service at any time traffic conditions permit.

By calling "1404," a subscriber reaches an information operator over a "common" trunk assigned to "time" service. When the calling signal glows on this trunk, the time of day is stated by the information operator without other preliminary or subsequent words.

Fire and police calls are made by any subscriber calling "10" and are intercepted by the information operator, who will ascertain the department wanted, and, by depressing a key, forward the call to the department requested, at the same time locking up the connection to preclude the called party's switch releasing upon hanging up.

The latter precaution is taken for the reason that the subscriber might under stress of excitement hang up without giving the location, or the call might be made through mischief. Since the call is locked up, the switchboard attendant is able to trace the call immediately by notification through an automatically-given signal, so if there should be any misunderstanding the operator will know from what line the call came and can supply the information to the proper department.

The woodwork of all the desks is solid quarter-sawed oak of plain, but massive, design. It is ammonia-stained, finished dull, and withal presents a most pleasing and substantial appearance.

The policy of the company is to render any service to its patrons it deems within the province of a telephone company. In this connection it may be stated that the directory issued by the company to subscribers contains a numerical list both for the convenience of the public and to forestall as many requests as possible for this information from the information operators. The directory also carries the name and telephone number of the subscribers throughout a large territory in central Indiana. This, however, is a commercial measure in the interest of its long distance service.

The factory is now rushing the manufacture of 3,440 line switches and 7,200 connector bank equipments for the exchange, the first installment of which is scheduled for delivery in service in about 60 days.

Outside cables enter on main distributing frames and are jumpered to Automatic Electric Co.'s type protectors with sneak current coils. From these, terminal cables lead to vertical terminals on the I. D. F. From these latter terminals, lines are jumpered to the connector bank terminals on the horizontal side and to the line switches.

Where party lines are concerned, an intermediate branching block is used between the vertical terminal of the I. D. F. and the horizontal terminals, so it is possible to separate any branch of a party line without disturbing or chancing the introduction of trouble into another branch not concerned.

The telephone company has been represented in engineering matters by E. L. Cline, general manager and chief engineer. H. M. Friendly has acted in an advisory capacity for the company. H. W. Munsell is superintendent of equipment.

New Equipment Installed by Wisconsin Company.

The Bayfield County Telephone Co. of Washburn, Wis., has completed the installation of new instruments and a common battery switchboard. The rural lines will be cut over to the new system, giving the country subscribers the same service enjoyed by city subscribers.

Improvements to Telephone Plants at Boerne, Texas.

The Kendall County Telephone Co. is making a number of improvements to its plant in Boerne, Texas. Cable is being strung through Main street, thus doing away with the overhead wires, and an addition is being added to the switchboard. The improvements will cost about $2,000.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

101. Outline the method used for the computation of interest during construction.

102. Discuss Tables IV, V and VI, which illustrate the method of computing interest during construction.

103. How should plant in process of construction at the date of appraisal be treated?

104. By what methods may the reproduction cost of construction in process be ascertained? What exception may be made to those methods?

CHAPTER V. Collateral Construction Costs (Concluded).

105. *Working Capital.*—An operating utility corporation—or for that matter, any other business concern—requires a certain amount of ready cash, or working capital, to transact its every-day business. The company must be in a position to take advantage of discounts offered for prompt payment of bills and to advance to district managers and commercial agents, periodically, sufficient cash to facilitate the proper handling of the business of their respective departments.

Courts and commissions are in general agreed as to the propriety of including an allowance for working capital in an appraisal for rate-base purposes. The amount required will, of course, depend on the size of the utility and the nature of its business.

The determination of a proper allowance for working capital may either be made on a percentage basis—a percentage of the direct construction costs—or, perhaps somewhat more accurately, by ascertaining the capital required to operate the company for the several years preceding the appraisal and using this as a gauge of the amount of the working capital which may properly be included in the appraisal.

106. *Computation of Working Capital.*—An illustration of the method of computing working capital, taken from an appraisal of a telephone property, is presented in Table VII. Working capital, in this appraisal, has been taken as those funds necessary to provide for a reasonable cash balance to permit the proper conduct of the business; to provide employes' working funds, and to cover amounts due from subscribers and agents.

It is based on the experience of the company for the 2½ years prior to the date of the appraisal, and has been calculated on the basis of the average per subscriber's station during this period, applied to the number of subscribers' stations in service at the date of the appraisal.

Date.	Average number of stations.	Average working capital.	Average per station.
1912—			
First 6 months.	47,894	$151,011.04	$3.15
Second 6 months	52,401	202,756.11	3.87
1913—			
First 6 months.	57,220	160,719.95	2.81
Second 6 months	61,462	228,136.39	3.71
1914—			
First 6 months.	65,115	194,088.47	2.98
Average 2½ years	56,818	187,342.39	3.30
Number of stations in service June 30, 1914, was 67,125.			
67,125 stations at $3.30, $221,513.			
Total working capital, $221,513.			

Table VII. Computation of Working Capital.

107. *Relation of Collateral Costs to Other Costs.*—In summing up the collateral construction costs, it may be said that each of the component items, with the exception of construction in progress and working capital, represents elements of cost which are just as real and just as essential to the construction of a utility property as those embodied in the unit costs.

It is unfortunate that the collateral costs cannot be included in the unit costs. Their segregation sometimes creates the erroneous impression that they are something entirely apart from the direct construction cost—something that has been added for good measure.

Several cases might be cited where counsel representing municipalities or civic organizations in rate cases, either through ignorance of the subject in hand or through a wilful attempt at misrepresentation, have tried to prove that the collateral costs—or "Overhead" as they are sometimes called—are not a real element of cost but an imaginary value added for the sole purpose of padding the total value of the plant. Fortunately most of the state commissions, and many of the courts, have had a wide and varied experience in appraisement problems and are disposed to be absolutely fair in their allowances for collateral construction costs.

108. *Percentage Values of Elements of Collateral Costs.*—If computed on the basis of a percentage of the direct construction costs, the usual range of values assigned to the various elements of collateral costs, is as follows:

General and legal expense during construction	2 to 6 per cent
Engineering and general supervision during construction	5 to 9 per cent
Taxes and insurance during construction	3 to 5 per cent
Interest during construction	5 to 8 per cent
Total collateral, or overhead, expense	15 to 28 per cent

It is customary to determine the present value of the collateral construction costs by depreciating them at the same rate as the direct construction costs. In other words, the ratio of the present value of the direct construction costs to their reproduction cost, when applied to the various elements of collateral cost, will give their respective present values. Working capital and plant in process of construction should not be depreciated for obvious reasons.

CHAPTER VI. The Non-Physical Assets.

109. *Elements of Non-Physical Assets.*—In arriving at the total reproduction cost, there still remains, after all of the component elements of the cost of the physical property have been considered, the "non-physical assets"—sometimes referred to collectively as the "intangible value."

Courts and commissions are quite generally agreed as to the propriety of including, in a rate-base appraisal, all of the elements of direct and collateral cost. They may, however, and frequently do, qualify the monetary values assigned to the various items by appraisal engineers. But when it comes to the non-physical assets the best that can be said is that many of the commissions have given this subject much time and thought. As a result the utilities are now receiving more

favorable decisions than would have been possible five or six years ago.

With the possible exception of good will and contract value, there is nothing unreal or ethereal about the non-physical assets. They are not, as so many people seem to think, added to the appraisal merely for the purpose of obtaining a maximum plant valuation to the ultimate end of squeezing the highest possible rates from the service subscribers.

Such items as cost of establishing business, franchise cost, and cost of financing, are real elements of the cost of building up any going utility business. They represent appreciable expenditures. In the writer's opinion, the difficulty in the past of obtaining favorable rulings as to the non-physical assets has not been due so much to doubt in the minds of commissioners regarding the existence of an intangible value as to the difficulty in allocating the expenditures involved and to the lack of clear-cut, readily-analyzed methods of estimating such expenditures.

The non-physical assets, it will be remembered (section 53, TELEPHONY of February 3), are: Good will, franchise value, cost of establishing business, cost of financing, and value of contracts and agreements.

110. *Good Will.*—It is commonly conceded that good will can have no place in the valuation, for rate purposes, of a monopolistic utility. Lord Elden, in discussing good will, says:

"Good will is nothing more than the probability that the old customers will resort to the old place—that it involves an element of personal choice, and is inappropriate where there can be no choice, and, therefore, should be given no value."

In the telephone field, however, we are constantly confronted with cases where, apparently at least, there is an element of choice. Two telephone companies operating in the same town may have a large number of subscribers in common. But, even in this case, it is obviously out of the question to capitalize good will in the appraisal of the property of either company for rate adjustment purposes.

Circumstances might arise, however, where one of the companies would be willing to pay considerably in excess of the actual value of its competitor's property to eliminate its rival from the field. In such a case it is probable that the purchase price would include an allowance for good will, but, undoubtedly, such an allowance would take the form of a maximum valuation of the various elements of direct and collateral construction cost, rather than as a specific allowance set aside in the appraisal for good will.

Changes of ownership of utility properties are subject to approval of the state commissions, and it is highly improbable that any commission would ratify a sale where the element of good will was distinctly set forth in the purchase price.

A liberal-minded commission might, however, recognize that the property had a competitive value over and above the actual value of the plant and therefore allow the use of somewhat higher appraisal units than would otherwise be justified. But cases of this kind are exceedingly rare. For all practical purposes. good will is not to be considered a factor in public utility appraisal work.

111. *Value of Contracts or Agreements.*—It frequently happens that operating utility corporations have exceedingly profitable contracts or agreements with other utilities. A telephone company, for instance, may have an agreement with the local electric light company providing for the free use of the latter's poles throughout an entire section of a town. Usually an arrangement of this kind is reciprocal—the electric light company, in return for its concession, being granted the privilege of the free use of an equal number of telephone poles.

Undoubtedly agreements of this nature are exceedingly profitable to the beneficiaries, obviating, as they do, appreciable outlays for pole plant.

Attempts to assign a value to contracts and agreements in rate-base appraisals have met with the almost universal disapproval of courts and commissions, except in cases where the utility corporation can show that the securing or carrying out of such contracts involved actual cash expenditures.

One notable exception to this rule is found in the case of the Union Electric Light & Power Co. of St. Louis. This company was permitted by the Public Service Commission of St. Louis to capitalize at 8 per cent. the rentals saved through an agreement with the local telephone company involving the free use of the latter's poles. The total contract value assigned was $80,000.

Where actual costs are involved in the securing or carrying out of an agreement, as a rule, there is a little difficulty in convincing public utility commissions as to the propriety of including such costs in a rate-base appraisal. In the case of a telephone company these costs usually consist of the salaries, carfare and incidental expenditures of the special agents employed in securing the agreement, and any payments the telephone company may make to the foreign company to cover the expense of re-arranging the latter's interests to provide room for the telephone company on the poles that are to be jointly used.

The cost of re-arranging an electric light company's wires and cables to facilitate joint pole use has been found to average from 50 cents to $1 a pole. The latter figure has been used in several recent appraisals. *(To be continued.)*

Authorship of Articles on Motor Trucks in Telephone Service.

In volume 12, No. 5, of the Commercial Car Journal of January 15, 1917, an article appeared entitled "The Motor Truck in Telephone Service," by C. L. Edholm.

In the March 10, 1917 issue of TELEPHONY, volume 2, No. 10, this article was reprinted with the note "Published through the courtesy of the Commercial Car Journal."

I am mailing to you, under separate cover, the July, 1916, number of the Telephone Review, volume 7, No. 7. You will find published therein, an article entitled "The Transportation Problem of the New York Telephone Company" by W. M. Van Deusen and J. McLachlan.

You will find the article published by you and credited to Mr. Edholm to be merely a re-arrangement of The Telephone Review article. The cuts are identical and the text matter nearly so.

I feel confident that The Telephone Review would have courteously extended to you permission to reprint the original article. I am sure it is not your intention to aid literary piracy, and that you will be glad to know of this case. I trust you will find it your pleasure to rectify this particular matter in some suitable manner. W. M. Van Deusen,

Brooklyn, N. Y.

Construction supervisor splicing and testing, New York Telephone Co.,

[EDITOR'S NOTE: TELEPHONY gladly publishes Mr. Van Duesen's letter in order to properly set the authorship of the article in question before its readers. We regret that Mr. Van Deusen and Mr. McLachlan were not credited with the authorship of the article as they would have been had there been any suspicion as to its genuineness.]

Sunshine and Shadows Along the Telephone Trail.

By Well Clay.

We love our German cousins,
  We love the sturdy Dane,
We love the sons of Norway,
  And the fiery boys of Spain;
We love the honest Irish lads,
  And Lars and Ole, too;
The Frenchman and the Britisher,
  You're welcome, all of you.

You're welcome to America,
  The good land of the free;
You'll meet with no obstructions
  When you come from o'er the sea.
Our latch-string's out to all the world:
  No trouble here you'll find,
If you take a tip, when you start your trip,
  And leave your guns behind.

We're sorry for the wars abroad,
  We want no wars at home;
You're welcome to our charity,
  If the seas we're free to roam.
You're welcome to the best we have
  And a warm handclasp you will find,
But don't forget, we still can shoot,
  So leave your guns behind.

Ten Years in the Ground—In Perfect Condition

This "Armco" Iron Culvert 36 inches in diameter and 20 feet long was installed in 1906, in Hill County, Montana. On account of change in road it was taken up and found to be in perfect condition. Mr. Joseph Berthlote, the County Commissioner, is standing beside it.

ARMCO IRON Resists Rust

This Is the Verdict of Experience

Where metal products are exposed to the atmosphere or buried in the earth, their material should be standard high-purity iron—Armco Iron.

The qualities that made the iron of a hundred years ago far more durable than modern steel produce exactly the same results today.

They are Purity, Evenness and Density.

In these respects Armco Iron is the nearest approach to perfection that is commercially available. It is The Iron That's Made To Last.

Armco (American Ingot) Iron is the logical material for Roofs, Pipes, Transformer Tanks, Guy Anchor Rods and other Pole Line Supplies which have to withstand the forces of corrosion.

The Rods of Matthews Scrulix Anchors, made by W. N. Matthews & Bro., Inc., of St. Louis, are of Armco Iron. They are guaranteed for long and faithful service.

AMERICAN ARMCO INGOT IRON

The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by The American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

The American Rolling Mill Company

Licensed Mfrs. Under Patents Granted to the International Metal Products Co.

MIDDLETOWN OHIO

Branch Offices at New York, Washington, Atlanta, Pittsburgh, Chicago, Cincinnati, Cleveland, Detroit, St. Louis and San Francisco.

It seems that there is quite a possibility that before many moons are passed we may be mixed up in a real scuffle with our friends from over the sea. We do not want war, and the people over there do not want war, but the officeholders seem to be always fixing things so there *must be war.*

When war comes, we may not be prepared in all ways. But there will surely be some big corporations, whose past experiences and ever-fixed policy of universal domination of all activities in their sphere of action, that will be more or less in training, so to speak, for the new order of warfare. Instead of the old order of fighting, however, there will be a change of ammunition from verbal and written missiles to real metal. Aside from that, and the fact that casualties will change from financial to physical, there will be little difference.

There have been corporations before now which have declared war on supposedly weaker competitors in *their* chosen field of endeavor and have used, in carrying on that warfare, all the tactics used, aside from actual flesh and blood battles, in a real war.

We have heard of corporations that sent out spies; announced ultimatums; torpedoed their adversaries' ships under cover of secrecy, bombarded from long distances with big guns some projected movement of the opposing army, or small detachment of it; placed mines, shut off supplies, levied indemnities, fought long and expensive sieges for ground which was of little value when secured; and indeed run the scale of warfare which, if it did not cause physical wounds and death, did wreck physically, morally and mentally.

Their adversaries at times, too, did open the way of reconciliation and settlements which would allow both armies to occupy logical territory in peace and prosperity. This had all outward appearances of success for a while, but it appears that deep down under the pleasant exterior, there still existed the intention and desire on the part of the big generals to really insist on peace being of such a nature that they alone received benefit.

You may call it militarism or monopolism, but the result is the same in both cases. No one who expects to live in future where either dominates can safely let either attain unchecked the end they desire.

Until a question is settled with justice to all parties interested, it is never settled. We may expect a recurrence of the same old tactics under different guises, as time passes, as were used when Noah went to school, if he ever did. The wheel goes around like the cycles of the ages and the history of business written for those who come after us should read about as follows:

In the beginning was created, Party; Party begat Power; Power begat Pride; Pride begat Pompousness; Pompousness begat Arrogance; Arrogance begat Misconception; Misconception begat Trouble; Trouble begat Suffering; Suffering begat Revolution; Revolution begat Destruction; Destruction begat Woe; Woe begat Charity; Charity begat Investigation; Investigation begat Reconciliation; Reconciliation begat Reform; Reform begat Advancement; Advancement begat Prosperity; Prosperity begat Monopoly; Monopoly begat Greed; Greed begat Injustice; Injustice begat Revenge; Revenge begat Loss; Loss begat Retardation — and so it goes on around the ring and the generations from Party to Retardation were several.

In order that one be deemed wise in these days, he need not be a prophet, as of old, but merely a historian. Everything seems to go in cycles from a molecule to a monopoly. Each has its creation. It goes through its alloted changes and finally ceases to be visible as such — changes form probably and becomes part of something else.

In case of war being declared, I suppose it might be very likely that events be such that all common carrier corporations would find a neat invitation in their mail some morning to consider that henceforth they are under direct orders of the party.

These indeed are wonderful times and the telephone is one of the most wonderful servants we have. We sit here in Minnesota, snowbound — not a train in or out of town for days and prospects good for a long drawn-out strike on top of that. We have not seen a daily paper for some time. Our principal occupation is shoveling snow and explaining to rural customers, 18 miles out, why we cannot come out at once and put in some new batteries.

What do we do to find out what is going on outside? We go into executive session with our telephone, as one in the dark ages would retire to his candle-lighted santuary to consult with his favorite oracle. There is one difference. We get results. The other fellow didn't find out, until time had unrolled the scroll, just how things were that he was worrying about.

We find that a big railroad strike has been called; we find that the present representative of an institution of the ages — the Czar of Russia — has stepped off his throne at the command of some fellows who but a short time ago would have been executed at the slightest indication that such was his pleasure.

The Czar was pretty much of a monopolist himself, when you are speaking about some of the representative ones. There would have been considerable emphasis to his snort of disdain had some one told him a year or so ago that shortly the common people were going to assume control of their heritage. You couldn't blame him, you see, because he did not even know that they had any other heritage than to labor faithfully and be ready to die, when called upon, for their lords and masters. His education had been neglected but he is receiving a little belated instruction now.

Then when a thing's a style, how others do imitate the thing! I would hate to be keeping a crown warm in these days.

These things and many others the little telephone tells me. It matters not whether the news is from Russia or from China; from the Sandwich Islands or Australia, those twin sisters — the telegraph and the telephone — are right on the job and serve the news up to me without loss of time.

Wouldn't it be too bad to have these two sisters under the control of one person or corporation for fear they might make mistakes and assume powers which were not meant for them.

APHORISM: Unlimited license is bad for the people, but worse for the powers.

From Factory and Salesroom

Conventions: Southern States, Louisville, Ky., May 24-26

Telephone Directory Gives Transmission Hints.

A very plain and easily read directory is the latest guide of the Goreville Telephone Co., Goreville, Ill. The cover is an attractive green, and the names of the town and state appear under the name of the telephone company — a convenient detail which is missing in many directories.

The inside of the cover explains the rules and regulations briefly, yet clearly, outlined.

As this book was issued at the first of the year, several paragraphs are of the Seasons' Greetings for 1917. They are addressed to all patrons and users of the Goreville Telephone Exchange and signed by W. S. Terry, manager. The back cover has the following helpful service information.

"I Can't Hear You,"
Can be "Blotted Out" of Your Telephone Service.

It gathers no dust on your shelves—

The
SPERRY
Telephone Bracket
Guaranteed for 5 Years

Big demand from generous advertising—we furnish everything to attract customers and close sales.

One dealer sold 45 "Sperry's" to every one of the next best make. Another dealer sold "Sperry's" at the rate of 14 to 1.

That shows you what **your** customers will think of it when they see it—give them a chance.

Retails at $3.50
Not $5.00
You Make 45%

Complete with fixtures for attaching to top, side, or edge of desk, or to wall or partition. Handsomely finished in oxidized copper, or heavy nickel plate, or durable black enamel like the telephone.

Wire your orders for immediate shipment. Take six—return them if you don't sell them and get your money back.

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CONSULTING ENGINEER
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Power and Telephone Line Interference Problems.

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Installations made of the various Accounting Systems.
An Operating Accountant.
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ARROWSMITH ILLINOIS

CONDUIT COUPLING RODS
Harold L. Bond Company
BOSTON - - - MASS.

EDMUND LAND
69 Buhl Block Detroit, Mich.
Telephone Engineering. Plans, Construction and Supervision. Appraisals, Estimates and Reports.

Embargo on Lightning—
CHAPMAN ARRESTERS
Clear the Lines.
MINNESOTA ELECTRIC CO.
Minneapolis, Minn.

Watch this department grow.

MID-WEST SUPPLY COMPANY
Construction Material and Supplies
Square deal, try us
PLYMOUTH, IND.

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

"You can improve your own telephone service. Many complaints that you do not hear, or that others do not hear you, are possibly due to the improper method of speaking into the transmitter. Telephone engineers after exhaustive tests have made the following conclusions and are the authority for the following statements:

"The best results are obtained with the lips very close to the transmitter, just so they do not touch it. Removing the lips from the transmitter has the same effect as lengthening the line in use as follows:

One inch lengthens the line..... 57 miles
Two inches lengthens the line...128 miles
Three inches lengthens the line..179 miles
Four inches lengthens the line...218 miles

The telephone is now so common that it is naturally supposed nearly everybody knows how to use it correctly, but even the telephone men of long experience are surprised at the improvement in service made possible by a careful study of methods of speaking into the transmitter. Care in this matter will not only add tc your satisfaction and pleasure but will boost the service. The illustrations on how to use the telephone and helps in bettering service conditions were furnished by the Kellogg Switchboard & Supply Co.

Improved Switchboard Arrester Placed on the Market.

The improved No. 69 switchboard arrester shown in the accompanying illustration is manufactured by the Stromberg-Carlson Telephone Mfg. Co. of Rochester, N. Y. It is intended for local battery exchange installations and furnishes adequate protection against abnormal currents and high potential discharges due to lightning. The company states that the arrester is efficient, practical and sold at a price within the reach of every switchboard purchaser.

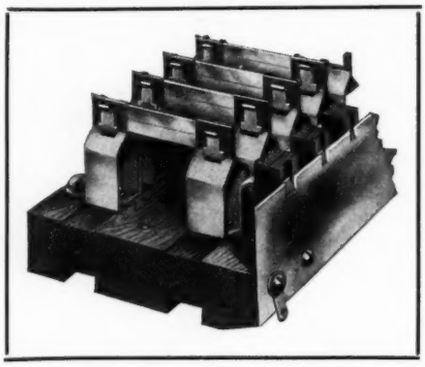
The No. 69 switchboard arrester comprises two elements, an arrester strip and a jumper strip. The arrester strip consists of a hard maple base, 11 ins. long by 3¼ ins. wide, having mounted thereon 10 pairs of carbon block arresters and fuse mountings arranged for copper terminal mica enclosed fuses. The units are spaced upon ½-in. centers. A ground strip runs the full length of the strip and is provided with a connector lug at either end.

Screw terminals are provided on the jumper wire side and soldered terminals on the switchboard side. Holes are drilled on the base alongside of the jumper terminals for "fanning-out" the wires. The jumper wire consists of a hard maple base, 11 ins. long by 1⅜ ins. wide with 10 pairs of connectors spaced upon ½-in. centers. The line cable side is arranged for soldered connections and the jumper wire side with crew terminals.

The arrester and jumper strip units are of convenient size for the growing exchange and are arranged for mounting upon a wall or on a vertical iron distributing frame section of 50, 100 or 150-line capacities, as desired. All equipment is secured to the mountings by machine screws extending through the wood with nuts in a recess on the back so that they can be tightened at any time without removing the strip from its fastenings. The fuse and carbon blocks are clamped firmly under a constant pressure to preclude the possibility of loose connections and imperfect contacts.

Channel iron distributing frames for the No. 69 arresters are made in vertical sections 6 ft. 6 ins. high, and arranged for mounting either 50, 100 or 150 pairs of arresters and jumper strips. When a greater equipment is required, two or more vertical sections are installed side by side.

Any person interested in this arrester can obtain further details by dropping a line to the advertising department of the Stromberg-Carlson company at Rochester, N. Y.



No. 69 Switchboard Arrester.

Monarch Telephone Mfg. Co. at the Iowa Convention.

The Monarch Telephone Mfg. Co., of Fort Dodge, Iowa, occupied its usual place of prominence with an interesting exhibit at the convention of the Iowa Independent Telephone Association held in Des Moines last week.

One of the principal features of the Monarch exhibit was the new model magneto switchboard which had previously been sold to the Kellogg Mutual Telephone Co., of Kellogg, Iowa.

This new style Monarch board is made up of Monarch apparatus of standard construction as used in all Monarch boards during the last 12 years, with the refinements which have been incorporated in the apparatus from time to time. The cabinet is of the low-type with plenty of key-shelf space and yet with a very easy reach for the operators. Much favorable comment was heard concerning the style and serviceability of this new model Monarch board.

The Monarch exhibit included late pattern common battery P. B. X. switchboards, both cordless and regular types, intercommunicating system equipment, standard magneto and common battery telephones, with a complete line of apparatus and accessories.

Those present representing the Monarch company were: B. H. Merriman, C. G. James, George O. Wilson and L. Q. Trumbull.

Book Review.

TELEPHONE APPARATUS, AN INTRODUCTION TO THE DEVELOPMENT AND THEORY, by George D. Shepardson. Published by D. Appleton & Co., New York; 337 pages, 6 ins. by 9¼ ins., with 115 illustrations. Price $3 net.

This is the kind of a book that makes the telephone man's heart glad and a desire arise to possess a copy. It is stated that this is the first extended treatise devoted to the general principles underlying telephone apparatus and the claim appears to be well founded.

It is divided into four parts, viz., Part I. Speech sounds, receivers and transmitters; Part II. Signaling equipment; Part III. Sources of electromotive force and protection; Part IV. Appendices.

From this it is seen that no attempt is made to discuss the equipment for making connections between lines. Only the talking and signaling equipment is considered and then the theory of the apparatus rather than that of the circuits, is discussed. Mathematics are used but the more extended mathematical developments are segregated in the appendices, the conclusions only being incorporated in the body of the text.

One of the features of the book is the many references to the writings of various authorities. To the student and those of a studious mind, this is a most valuable feature. For a reference book of telephonic data by the inventor and manufacturer, the book will be of great value. The engineer and the practical man and those who wish to understand the scientific aspects of telephony will find this volume an excellent one for the purpose. It is a welcome addition to the literature of the telephone art.

Lincoln Company Reports Increase in Stations.

The monthly report of the Lincoln Telephone & Telegraph Co., Lincoln, Neb., shows that in the 99 exchanges that now compose its system a gain of 254 stations was made in February and a gain in the first two months of the year of 448. Fifty-seven exchanges showed gains during the month, 16 no change and 26 decreases. The company now has a total of 53,270 stations. The three largest exchanges are Lincoln with 12,916, Hastings with 3,102 and Beatrice with 2,542.